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ABSTRACT

This handbook describes the curriculum and academic standards of the Edison Project's Junior Academy for students aged 11-14. The academy features a student-centered environment, daily meetings in advisory groups, family involvement, exposure to the "Greats"--world-changing ideas, outstanding works of art from different cultures, and key technological innovations; project-based teaching and learning; an integrated curriculum; flexible grouping and scheduling; student access to technology; and ongoing student assessments. The handbook describes project standards and curriculum for each of the following disciplines: history/social science; language arts; fine arts; mathematics and science; character education; physical fitness and health; and practical arts and skills. A list of acknowledgments is included. (LMI)

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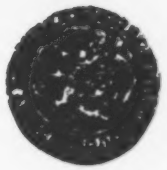
Student Standards for the Junior Academy



The Edison Project

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Introducing

The Edison Project

The Edison Project provides the design for a new kind of school, one that keeps pace with the social and technological changes our children will encounter. Public school partnerships will make this design a reality for pioneering school systems throughout the United States.

The Edison school design is highly ambitious, intended to encourage fundamental change in schools. We propose a rich and challenging curriculum for all students; a professional environment for teachers; more effective use of time by students, teachers, and administrators; technology for an information age; and careful assessment that provides real accountability.

About the Standards

At the heart of our school design are world-class standards that set forth what students should know and be able to do in order to be active, contributing participants in the world of tomorrow. These standards communicate high expectations to students, teachers, and parents. The student standards also bring coherence to the overall school design and serve as the basis for the Edison curriculum, instruction, and assessment system.

Curriculum Support

The Edison Project, in concert with its public school partners, will develop a wealth of curriculum materials to support the student standards. Chief among these products are computer-based, interactive frameworks that contain outlines of every subject area, strategies for integrating content across subject areas, model lessons, and a variety of instructional resources. Teachers get access to, add to, and adapt the frameworks via the computer. Our networked system also allows teachers to share curriculum and instructional materials with their colleagues across the country. In addition, The Edison Project will supply teachers with a wide variety of print-based instructional materials.

Many great works of art and intellect, such as Aesop's fables and Bach's *Well-Tempered Clavier*, were originally intended for instructional purposes. All Edison teaching materials, both print- and computer-based, will be consistent with our view of the "well-tempered" curriculum, one that endures as a work of art.

Structural Support

Each school is divided into six academies. The Readiness Academy serves three- and four-year-olds; the Primary Academy is for children in kindergarten through grade 2; and the Elementary Academy is for grades 3 to 5. The Junior Academy serves grades 6 to 8; the Senior Academy, grades 9 and 10; and the Collegiate Academy, grades 11 and 12. Each academy is further divided into houses of 90 to 120 students. Students remain with the same house throughout their academy experience, though the makeup of the house changes each year as the oldest students graduate and new students enter the academy. This unique structure, combined with the other essential elements of the Edison program, allows students to achieve the standards for each academy at their own pace. Working with the same team of teachers over an extended period of time provides students with needed continuity and support and enables them to progress at a rate that ensures their confidence and competence.

About This Book

The standards in this publication describe the knowledge and skills that students will have when they complete the Junior Academy. These standards, along with the standards for the other Edison academies, ensure that students leave school with more than a piece of paper. They graduate with powerful academic, artistic, ethical, and practical tools for living successful and productive lives.

The standards for the Junior Academy are consistent with students' intellectual, social, and developmental needs and are organized into five categories: humanities and the arts, mathematics and science, character and ethics, physical fitness and health, and practical arts and skills. Illustrated here are descriptions of our approach to each subject; sample classroom projects and activities; examples of outstanding books, performances, and other materials; and ongoing assessment activities through which students demonstrate their growing knowledge and skills.

Taken together, the standards and accompanying activities, resources, and assessments paint a vivid picture of life in an Edison partnership school. We hope you come away from this publication with a clear understanding of how the challenge of standards and Edison's comprehensive school design can motivate students to achieve at high levels.

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Some of the world's greatest inventions, discoveries, and ideas began with a sense of wonder. Why is the night sky dark? What makes an apple fall from a tree? What ideals govern a good life? Questions like these have inspired human beings to search for deeper knowledge about the natural, physical and social worlds in order to better understand their surroundings. And problems such as how to explore the skies beyond our vision have led to inventions that changed the course of history. This spirit of wonder is at the heart of learning in the Junior Academy.

Early adolescents from the ages of 11 to 14 are committed to understanding themselves, their place in their community, and their community's place in a changing world. Many of their questions are about their immediate environment, but others, concerning science, nature, and the arts, have captured the imaginations of scholars, historians, and scientists throughout the ages. Finding answers to such questions—and understanding that some questions can't be answered easily—are among the challenges of learning in the Age of Wonder. By finding out how the world works, students learn more about their place in it.

Students' deeper questions about themselves and their world arise at an exciting time in their development. Psychologists and cognitive scientists observe that most students at this age are beginning to reason abstractly, to make connections among ideas, and to assimilate knowledge in powerful new ways. They are ready for the advanced learning that characterizes the Junior Academy, and their natural spirit of wonder provides the motivation for acquiring knowledge and practicing new skills.

Early adolescents are embarking on an exciting intellectual journey, but as educators observe, they are often more concerned with who is sitting next to them than with where they are going. In order to engage the hands, minds, and hearts of these

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students, the curriculum is carefully connected to their questions about the world, and it puts to good use the knowledge and skills they have mastered in previous academies.

Much of the work students do in this academy grows out of their sequential study of history. This study, called Mesopotamia to Modern Times, emphasizes ancient to medieval worlds and both the Native-American and European early exploration and settlement of North America. It is the beginning of a five-year sequence that continues through the Senior Academy. We chose this theme for the Junior Academy because it is an appropriate study for students' expanding intellectual capacities, and it helps them see that many of the questions they ask today have been asked before. In fact, learning to ask questions that lead to deep study is an important part of knowledge and skill building in this academy.

Edison's near-to-far approach takes students back to the world's earliest civilizations while constantly relating what they learn about ancient times to the here and now. In this way, students learn that everything in their contemporary world—from athletic gear to music to modern telecommunications—has its roots in the past and evolved over many generations. Recognizing the all-important connection between "then" and "now" is central to exploration in the Junior Academy.

Inside the Junior Academy

The students in one house are putting the finishing touches on their museum exhibit of ancient artifacts. Coordinated by the language arts teacher and assisted by the science, visual arts, and history teachers, groups of students have spent a week exploring photographs of actual artifacts from ancient civilizations. The language arts teacher has guided them in keeping a journal of their activities; the science teacher, with the help of computers and television, has helped the students investigate how artifacts are unearthed, dated, and catalogued. Local, state, and national museums have contributed facts and insights. The history and visual arts teachers have supervised the students in creating models of artifacts for display in their own museum. Now the students are writing detailed descriptions of the artifacts to be displayed on wall plaques. After the students install the exhibit, they will invite parents, peers, and community members to attend a gala museum opening, which they will plan and execute from start to finish.

In another house in the academy, Mrs. Walsh's language arts students are pouring over data from "Heroes of Young America," an annual poll found in *The World Almanac.* As they study heroes from the ancient world, students also have been reading books about modern-day heroes in fact and fiction, including *The River* by Gary Paulsen and *Checking on the Moon* by Jenny Davis. In addition, they've recently polled the entire academy to create their own "top ten" list of contemporary heroes. Now the students are comparing their survey with the national survey and discussing why they agree or disagree with their contemporaries' choices. Finally, students will compare modern heroes with heroes from the ancient world.

The Junior Academy celebrates and preserves students' natural sense of wonder.

Meanwhile, in Ms. Andersen's music class, small groups of students are composing their own Gregorian chants, which they will later perform for the entire academy. The students became fascinated with this early classical style of music during their study of the Middle Ages. They've discussed the structure, pitch, rhythm, and emotional impact of chants and are applying what they've learned to their own compositions. Using their early study of Latin, the students also analyze the meaning of chant texts and discuss the religious context. Ms. Andersen moves from group to group, noting the students' progress and occasionally making suggestions.

Students have been in school for several years by the time they enter this academy, and at this age, *boring* is a common adjective used to describe everything from lunch to reading. The Junior Academy celebrates and preserves students' natural sense of wonder at a time in their lives when that spirit may begin to diminish. The search for answers to their questions about the world keeps early adolescents focused on acquiring information and practicing skills. And because people who enjoy their work are better at what they do, students learn in an environment that provides opportunities for playfulness and fun. By the time they leave the Junior Academy, students will have acquired sophisticated knowledge about the history of the ancient world and how its people and events influenced the world of today—in this country and abroad. Their developed perspective on the past and how it connects to the present will leave them well prepared for their future work in the Senior Academy and beyond.

Our World

The Junior Academy celebrates students' expanding capacity to understand and interact with the world they live in. The middle grades are more than a transition between the elementary grades and high school. To borrow from the words of a popular song, "these are the days of miracle and wonder." During the middle years, students begin to pose important questions about their world, to explore abstract concepts and ideas, and to know what they know. When that happens, students often experience moments of wonder and awe. The Junior Academy is designed to inspire and nurture those moments.

We are emphatically positive about the abilities of middle school students, but we're also realistic about the problems they face during these important years. Early adolescents need help from caring adults in order to develop their minds and their emerging characters. Our program is based on reliable research about effective middle schools and on the practices of successful educators. We provide an emotionally supportive school climate that ensures the constancy students at this age need and a curriculum organized so that by the time they leave this academy and move on to the next, they will have learned how to:

ACQUIRE and use knowledge through hands-on projects that span the curriculum

CONNECT what they learn in school to the world outside the classroom

DIRECT some of their energies toward helping others

BECOME informed and knowledgeable, and show good judgment

MAINTAIN a high level of interest in academic achievement and stay motivated to learn more

The Distinctive Characteristics of the Junior Academy include:

The Edison structure addresses the changing interests, abilities, and needs of early adolescents. For example, the Junior Academy is divided into houses of 90 to 120 students each. A typical house would include 35 sixth graders, 35 seventh graders, and 35 eighth graders. Students stay in the Junior Academy with the same team of four teachers for an average of three years, allowing each student ample time and necessary help to meet our high expectations. This practice also eliminates the disruption of having many new teachers each year and provides students with needed continuity and support throughout the program.

Strong and durable relationships with caring adults are key to constructive development for students in this academy. At a time when adolescents may feel isolated and anonymous, the school-within-a-school approach ensures that they are well known by their teachers and have continuous opportunities to form strong relationships with peers as well as adults.

To ensure that all students get the help they need, teachers use a range of strategies including direct instruction, reteaching, cooperative learning, and tutoring. We supply substantial resources, including technology, which teachers and families can use to boost student achievement. The Edison Project provides extensive professional development experiences for teachers in all partnership schools, designed to help them develop and increase their repertoire of teaching techniques.

Home Base Advisory. In this academy, Home Base Advisory is an extension of Edison's morning meeting concept. All students will have an adviser at school. Members of the school staff, including music, art, world languages, and physical education specialists, act as mentors and advocates for small groups of students in each of the academy's houses. Advisory groups meet most mornings so that students can begin their day on solid ground.

Adult advisers receive professional development in order to guide students academically and socially. Sometimes that means focusing on study skills that can help students succeed. Other times it means facilitating impromptu discussions on impor-

tant issues. On some occasions it may mean seeking special assistance in order to meet special needs. Advisers may lead their groups in formally structured activities designed to help students think about and discuss their concerns in areas such as friendship and schoolwork. Recent research on successful middle schools indicates that the bond between adviser and advisee often makes the difference between a student who is apathetic and a student who is actively engaged in learning.

Close Involvement With Family. Schools across the country report a dramatic decrease in parental involvement as students grow older. But students at this stage of development need the support of family members as much as ever. We introduce challenging new subject matter at this level, making close contact between home and school crucial to students' learning success. We sustain parental involvement through regular meetings and electronic exchanges, during which families and teachers discuss the students' progress and share materials and ideas. We provide families with access to print and electronic materials, so they can reinforce at home what their children are learning in school. Family members may also use the home computer that The Edison Project provides to pursue educational objectives, such as learning a language or job-related skill, and to speak with other families in the school community. Families are encouraged to participate actively in the life of the school as volunteers.

Families are encouraged to participate actively in the life of the school.

We take extra care to welcome the families of students who are new to the Edison system, and we build on the relationships with those families who have had children in an Edison school since the Readiness, Primary, or Elementary academies. Families that have trouble helping their child with schoolwork receive special assistance. And we identify an education advocate for the child while his or her family is receiving help.

Because parents exert a great deal of influence on their child's development at this crucial time in their lives, we strive to establish a climate of cooperation between family members and the school. We respect parents' primary role in discussing sensi-

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tive issues and actively seek their involvement in developing appropriate ways to address those issues.

Exposure to the Greats. In the Age of Wonder, students begin to explore complicated issues and ideas. More than ever, they know what they know and are eager to share their knowledge with others. We maintain this intellectual stimulation in a variety of ways. For example, all students are immersed in the Greats. The Greats include people, works, performances, ideas, and inventions that have shaped our world and have endured through the ages, or are emerging today. The Greats make school vivid and fascinating and provide a common core of knowledge shared by all students. At this level, the Greats focus on ideas that have changed the world, outstanding works of art from diverse cultures, and key technological innovations. Examples of these are listed throughout this publication. Students go beyond mere recognition of the Greats to a deeper understanding of how new ideas have affected—and continue to affect—the world.

The Greats make school vivid and fascinating and provide a common core of knowledge.

In the middle grades, when many schools begin to track students into college preparatory or vocational education classes, The Edison Project ensures that every student receives the background needed to continue advanced study of science and mathematics, to read quality literature, and to write and speak fluently in English and a second language. We are committed to providing all students access to knowledge of how the world works in order to expand their opportunities.

Project-Based Learning. Project-based learning is one of our main strategies, especially at this level, when students are capable of more sustained work. We also use direct instruction and other proven teaching strategies in all academies. Further, these strategies ensure that students have grasped the concepts they need in order to conduct project work that is well informed and focused. Students' projects

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are like exhibits in a museum to be researched, explored, and shared. In one long-term project students create an actual museum exhibit through which they share their developing knowledge of the ancient world.

Project work allows students to spend extended periods of time grappling with questions and issues that are important to them. Because projects require them to function much as they will in the adult world, they also learn to manage time, people, and resources. Students take more responsibility for their work and are more motivated because their projects are connected to the world outside of school and provide them with opportunities to use their newly acquired knowledge and skills. Projects also provide a mechanism for integrating the subject areas that students are learning about.

Project work allows students to spend extended periods of time grappling with questions and issues that are important to them.

Each quarter, for one to three weeks, the school suspends its usual schedule so that students can participate in special projects, called "intensives." Intensive projects—which may involve an entire class, a cooperative-learning team, or a single student—allow students and teachers extended opportunities to tackle larger problems or areas of interest. Often, students select their own topics to explore during intensives.

Quarterly intensives allow students to apply knowledge and skills to sophisticated problems. For example, in preparation for one project, students write to civic leaders asking for their help in identifying pressing issues in their community.

An Integrated Curriculum. Junior Academy students are better able to understand connections among subjects, concepts, and ideas than they were in earlier academies. In order to show the full range of knowledge and skills that students will acquire, the student standards for this academy are organized according to the commonly accepted divisions in the curriculum. In practice, however, the subject areas are frequently integrated. For example, students undertake an integrated study of the human body, which connects science, health, physical fitness, and the humanities. We never force curriculum integration for its own sake, but frequent integrated experiences

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capitalize on students' strong need to make connections and help them better understand the important ideas encountered in this academy. We aim all teaching and learning activities toward the goal of developing students intellectually, physically, and ethically so that they can participate fully in school and in the world.

Flexible Scheduling and Grouping. Edison's flexible schedule responds creatively to the developmental needs of early adolescents and to the in-depth nature of their work in this academy. Simply put, flexible scheduling means that the order of each day and the time devoted to each period may vary. For example, teachers who are planning an integrated study on the impact of natural disasters "then and now" may decide to increase the time usually devoted to science for the duration of the study. This type of scheduling prepares students for the structure of the adult workplace and allows teaching teams to accommodate the time requirements of different learning situations and to provide uninterrupted time for interdisciplinary project or team work.

Edison's flexible schedule responds creatively to the developmental needs of early adolescents.

Teachers group and regroup students for instruction based on the nature of the learning task. This allows students to reap the benefits of learning under conditions appropriate to the task at hand. These groups may be divided into smaller groups temporarily, based on common needs or interests. The groups are not rigid and are reorganized frequently. Students who would benefit from working in multi-age groups or with students of entirely different ages for specific subjects have the opportunity to do so. Students regularly work in multi-age groups for activities in physical fitness and health, the arts, practical arts and skills, and character and ethics. Students use and refine their language skills in integrated projects that span the curriculum. They read and discuss great literature in both same-age and multi-age groups.

Students also work on projects in multi-age groups. They benefit from social interaction with older and younger students and learn from one another. They may work in same-age or multi-age cooperative-learning groups, in which all the partici-

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pants work toward a common goal. Each student is responsible for making a specific contribution to the group, and teachers encourage, observe, and evaluate this work.

Students work individually on independent projects and one-on-one with teachers and tutors. They also may opt for, or the teacher may suggest, a quiet time for independent reading, thinking, or resting in a place designated for such activities.

Special Spaces for Learning. Teachers and students have access to well-stocked and well-organized classrooms. A special place in each house, called the Collaboratory, contains a variety of instructional resources. Students have ready access to the materials used by archaeologists, artists, authors, scientists, builders, and designers. Presentation stations contain state-of-the-art technology for designing and making multimedia presentations.

In this academy, the Collaboratory expands to encompass the community beyond the school building as students engage in service projects designed to apply concepts and skills. Community recycling centers, parks and recreation areas, senior citizen centers, and other sites for service learning are integrated into the life of the school as additional hands-on labs and work sites.

Access to Technology. Students use a variety of technologies at school and at home. By the time they enter this academy, they have mastered the basics of computer use and have already had computers installed in their homes for several years. They are comfortable with such technology and confident in their ability to use and care for it. In fact, Junior Academy students often function as technology support assistants for the school community.

In the Elementary Academy, students began to use technology in creative ways. In the Junior Academy, they build on that experience and discover the power of technology to enrich the learning process. For example, students now create multimedia presentations to communicate information on topics studied across the curriculum. They use sophisticated databases and

Students have ready access to the materials used by archaeologists, artists, authors, scientists, builders, and designers.

spreadsheets to explore mathematical concepts and to analyze scientific and historical data. They produce videos to enhance oral reports. They share written reports with other students in the Edison system by publishing them in the *Edison Encyclopedia of Ideas.* And, using the Edison network, they regularly connect with students and teachers in other partnership schools to complete cooperative projects, collect data, and share the results of their projects and investigations.

All partnership schools and homes are connected via the electronic network we call the Common. When a student, teacher, administrator, or family member sits down to work—at school or at home—he or she plugs the computer into the network (or dials it up with a modem) and is automatically on the Common. One's own digital folder, E-mail, and so on are all within "clicking" distance. The Common provides each person with a "virtual" desk and address within the computer-connected school community, accessible from any computer that can plug into the network.

Technology is a means for looking at the world in new ways, exploring powerful ideas and concepts, and connecting with people outside one's immediate environment.

For Junior Academy students, technology is a means for looking at the world in new ways, exploring powerful ideas and concepts, and connecting with people outside their immediate environment. They also use technology to write letters and notes, to publish books, to conduct lab experiments, to send E-mail messages and assignments, to analyze and display data, to play games, to watch videos and make their own, to take pictures, and to produce documentaries, art, and other exhibitions.

Students' progress toward the standards is assessed regularly. Teachers use a variety of techniques, many of which are embedded in the curriculum. We expect students to perform ably on a variety of assessment tasks, including open-ended problems, multiple-choice quizzes, performance assessments, and standardized tests. Some assessments are for specific subject areas and some integrate various subjects, asking students to apply knowledge and skills from several disciplines to solve

a problem. At this level, students' self-assessment plays a larger role than it did in earlier academies, and we regularly involve them in the evaluation of their own work.

Ongoing assessments provide teachers, students, and parents with clear and useful information. Each student's progress is reported on the Quarterly Learning Contract (QLC), an essential tool at each school. The QLC is the formal expression of an individualized set of expectations and responsibilities entered into by the school, the student, and parents. Teachers use this system to monitor progress and to prevent students from falling behind. Throughout the course of each academy and at the end of every year, assessments certify that students have met the required standards and are ready for new challenges. These rich problems and assessments provide students with opportunities to show what they've learned across the curriculum. Students who are recent arrivals to the Junior Academy may need more time to achieve the standards. We work this out with individual students and their families.

Teachers record students' progress in two formats: a physical portfolio containing the student's work and copies of the Quarterly Learning Contracts with teachers' observations regarding progress and the student's self-assessments; and an electronic portfolio, which is maintained by the teachers and students and shared with families. In this academy, students take increasing responsibility for selecting and revising work to be included in their portfolios and for maintaining the contents of their folders. Each student also submits a final portfolio that contains assessments designed to demonstrate how well he or she has grasped the important ideas inherent in the academy's themes. Teachers and parents can see what students have learned and the many thoughtful questions they have answered in the Age of Wonder.

Standards for

History–Social Sciences

Standards for
History

IN HISTORY, STUDENTS WILL BE ABLE TO:

IDENTIFY and describe the significance of key people, events, and technological developments, and key economic, cultural, and social institutions of the civilization studied

DESCRIBE the basic tenets of the world's major religions and cite examples of how each has been influential

COMPARE and contrast civilizations studied with one another and with the U.S. and other contemporary societies in areas such as government, family structure, technology, and economic activity

IDENTIFY and explain how civilizations studied have influenced the way we live today

DISCUSS present-day world news events with an understanding of the impact of historical forces on those events

ORGANIZE information about different cultures studied by constructing parallel time lines for given periods in history

USE historical research skills, such as evaluation of primary sources, comparing differing secondary accounts, and interpreting data on maps, charts, graphs, and diagrams, to investigate history

APPLY critical thinking skills, such as identifying cause-and-effect relationships, distinguishing fact from opinion, and drawing conclusions, to analyze historical developments orally and in writing

PRESENT case studies of civilizations using multimedia research and presentation skills to analyze, organize, and document information

EXPLAIN how the study of history has developed over time, responding to new technologies, methods of inquiry, and standards of analysis

IN GEOGRAPHY, STUDENTS WILL BE ABLE TO:

USE and construct special-purpose maps to explain, analyze, and interpret the places and events studied

LOCATE the civilizations studied on modern globes and maps and identify societies that are currently in those locations

EXAMINE the development of mapmaking skills by studying maps from different cultures and times

ANALYZE the interaction of people with their natural environment using relevant maps

EXPLAIN the significance of local climate and ecosystems in terms of how people live and work

USE computer and video technology to construct comparative maps, diagrams, and charts

DESCRIBE changing patterns of movement during the periods studied in response to new developments in technology and geographic knowledge

EXPLAIN the concept of regions as it applies to the study of history, geography, and economics

Standards for Geography

IN CIVICS, STUDENTS WILL BE ABLE TO:

IDENTIFY characteristic forms of government found in the civilizations studied

COMPARE and contrast the operation of key government and political institutions in the civilizations studied

EXPLAIN the roles of custom, law, and religion in shaping societies and human behavior

ANALYZE the historical development of democratic governmental and civic values, principles, and institutions

IDENTIFY the ancient and medieval roots of current principles and institutions of government and politics

PRACTICE democratic self-governance, such as through participation in student organizations, debates, and decision-making activities

Standards for Civics

Standard
Economics

IN ECONOMICS, STUDENTS WILL BE ABLE TO:

DESCRIBE characteristics of early economies, such as those found in hunter-gatherer, agrarian, and mercantile societies

EXPLAIN how key economic principles, such as supply and demand, and institutions, such as currency systems and banks, operate within a society

USE computer graphics and data organizers to demonstrate how basic economic principles, such as supply and demand, work with changing variables

INTERPRET historical developments in the cultures studied using economic understandings and analysis of available data

APPLY economic understandings to interpret news and opinion articles in the general press

DEBATE current events from an economic perspective, providing arguments based on clear economic reasoning and evidence

A newspaper editor was said to have once summoned an eager young reporter into the office. War had just broken out and the reporter was to leave immediately to cover it. By way of background information the editor told the reporter, "It started yesterday." The reporter quickly found out that she could answer four of journalism's five W questions without looking past "yesterday." She found out

Who, What, When, and Where easily enough, but when it came to Why, the trail to the answer kept leading farther and farther into the past. What had seemed to the editor to be old news—or no news at all—suddenly became for the reporter new and essential information.

History-Social Sciences

During the Age of Wonder, students find answers to many of their own Why questions by exploring the past. Whether the topic is rules of student government, the art in music videos, or the latest crisis in the morning headlines, the past is prologue to the present. Helping students to discover, understand, and value the connections—and the breaks—between the long ago and today is the goal of Edison's Junior Academy history–social science curriculum, which marks the beginning of a five-year journey of discovery that starts in unrecorded time and ends with the present in the last year of the Senior Academy.

In the Junior Academy, students use the tools that all historians use to make sense of the past, primary sources such as artifacts and documents, books and texts, computer databases and information sources, video, and multimedia equipment. With access to primary sources and technology, students are no longer passive observers of history—they are part of the action. They are detectives of time, place, and human interaction, who present their solved mysteries in multimedia presentations that capture the thrill of learning.

The Junior Academy portion of this investigation into the world's past focuses first on the diverse worlds of antiquity, from ancient Sumer and Egypt in the first year, to the classical worlds of India, China, Greece, and Rome in the second. In the third year, students explore a thousand-year period that begins with the birth of Islam and continues through an ever more interconnecting world, concluding with the first two hundred years of European colonization of the Americas.

Such a long journey to distant places and even more distant times can be either an incredible adventure or an incredible bore. Our challenge is to capture the imaginations of our student-adventurers. Movies like the *Star Wars* trilogy succeed in doing this with high-action narrative and vivid heroes and villains. History too, when taught as an engaging and meaningful story rather than just a dry list of dates and factual tidbits, can evoke a high level of interest and excitement. The exploration of complex issues of cause and justification can generate passionate engagement with historical events, characters, and processes. We take full advantage of history's narrative possibilities to inspire in students a sense of wonder about the people and events that came before us.

The Greats

It is one thing to be told by a teacher or a textbook that Marc Antony was a controversial figure in his day. It is another thing altogether to hear Cicero say, "Senators, you are mourning three armies of Roman soldiers slain in battle: Antony killed them. You are sorrowing for great men of Rome: Antony robbed them. The authority of your Order has been destroyed: Antony destroyed it. For every evil which we have seen since that time—and what evils have we not seen?—he is responsible."

Through Edison's Greats program, students read primary and secondary sources that allow the past to "speak" in its own voice. The role of the Greats in the Junior Academy changes with each offering. One selection may serve as a host introducing students to a time, place, or person. Another might appear like Cicero, demanding that the reader render a verdict on an individual's character. A third might represent a historian's perspective that challenges the student to a new evaluation. What doesn't change is the central role the Greats play in the history curriculum. They are not a grab bag of excerpts intended only to add a little flavor to an otherwise bland presentation of facts. They shape

and inform student investigations and, even more important, assist students in their development as critical thinkers and serious students of history. They demonstrate the pivotal roles of individuals in creating and shaping history.

Carefully selected for interest, value, and appropriateness, the Greats include legal documents, such as the code of Hammurabi; letters or speeches, such as Cicero's denunciation of Antony or his description of the eruption of Vesuvius; works in which myth and history merge, such as the Vinland sagas; or in which poetry and philosophy come together, such as the Vedas or the Tao Te Ching. In addition, students encounter the Greats in works of art, music, literature, architecture, drama, and dance; in the accomplishments of scientists and mathematicians; and in the artifacts, simple and monumental, of past civilizations. Here are just a few of the Greats students encounter in this academy.

THE GREATS:
CLASSIC WORKS

THE GREATS:
CONTEMPORARY
WORKS

The Door in the Wall by Marguerite de Angeli
The Golden Goblet by Eloise Jarvis McGraw
Then & Now by Stefania Perring and Dominic Perring
The Accidental Explorers by Rebecca Stefoff
The King's Fifth by Scott O'Dell

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Good Questions

History is the most inclusive of all disciplines. Rarely, if ever, can it be studied in isolation from geography, civics, economics, and the other social sciences. In fact, history often refuses to confine itself to the boundaries of the social sciences; it includes art, literature, science and technology, philosophy, and other disciplines. So to be a history–social science student in the Edison Junior Academy is to think like a geographer exploring time and space, or a political scientist puzzling over the development of rules and principles that govern people in a civilized society. Students also function as economists weighing the elusive forces of the marketplace and as biographers analyzing the motives of an individual who made the world a better—or a worse—place. History–social science students are archaeologists trying to get the silent stones to speak and students of art and literature examining the creative testimony of people from the past. In short, the history–social science curriculum provides many opportunities for students to acquire knowledge and to think critically and open-endedly about why things are the way they are.

History–social science students are archaeologists trying to get the silent stones to speak.

Students begin their investigations with this in mind. Using the tools of the archaeologist, the geographer, and the historian, they study wall paintings found in the dark recesses of Paleolithic caves. They sift through the archaeological evidence of the world's first towns and cities. They gather and organize information revealed in carbon-dated shards of pottery. As they work, students learn to interpret evidence, ask questions, draw conclusions, and ask new questions. What purpose, for example, might the painting of particular animals on cave walls have had? Or why did the settlement of Jericho endure and develop into a city when other settlements came and went? Students apply prior knowledge to guide their investigations, many of which involve the use of technology-based tools. What do we know about human nature or about the location of cities in our own time that might suggest answers to these questions? Working

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together in small groups or as individuals, students weigh the gathered evidence and develop conjectures that they then debate in front of their peers.

Developing Models of Investigation

As students advance through the Junior Academy, they continually apply the process of investigation to their studies of ancient, classical, medieval, and early modern civilizations. They develop organizational models—time lines, charts, and tables—that help them analyze what they learn and apply their knowledge to future investigations. Indeed, in one of their first activities, students work together to construct a class time line that will be one of the basic tools for organizing and discussing the societies they encounter throughout the academy. They create categories of classification, such as government, social organization, science and technology, economy and trade, that will enable them to begin investigations of new cultures and compare developments across time and space.

In all their investigations, students identify unique contributions and make connections between past developments and present-day accomplishments.

Students read and construct maps that answer geographic questions about the importance of location and place and about the relationship of the physical environment to political and economic issues. Why was Egypt more secure from outside invasion than Sumer? Why did the Greek city-states develop into trading powers? These are just a few of the questions that maps can help answer.

Students' understanding of economics becomes more sophisticated in this academy. They develop and apply their economic awareness to questions of social structure (surplus, specialization, wealth and class), trade (barter, coinage, accounting), and government (taxes, controlled economies, monopoly, oligopoly, imperial expansion).

In all their investigations, students identify unique contributions and make connections between past developments and present-day accomplishments—from the code of Hammurabi to the Twelve Tables to the Magna Carta to the U.S. Constitution, for example.

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A Case-Study Approach

Throughout their three years in the Junior Academy, students apply and refine these models of investigation, building on their growing understanding of the interconnections of history, geography, civics, and economics, using a case-study approach.

Some case studies may be required, such as those relating to ancient Sumer; Egypt in the time of the pharaohs; classical Greece, Rome, and India; Confucian China; the rise of Islamic civilization; medieval Europe; and the age of exploration. Organizational devices such as the class time line, student journals, and student portfolios help students compare and contrast cultures and times. They trace the development of common ideas and social institutions, and they examine the historical development of today's major religions—Judaism, Christianity, Islam, Hinduism, and Buddhism. Students come to understand the role that religion has played throughout history and how it shapes current world affairs.

Students round out their core studies with choices of their own, which they develop in collaboration with teachers. These may be focused on a particular civilization; the Inca empire or the Kingdom of Mali, for example, or may examine a single idea, such as the development of the idea of citizenship. In all units, however, students work together or in small groups to brainstorm questions, plan research, and revise plans as they learn new information. They gather information from a variety of sources—teacher lectures, source readings, video documentaries and dramas, computer software programs and online information sources, museum trips, and guest lectures by experts.

Students work together to brainstorm questions, plan research, and revise plans as they learn new information.

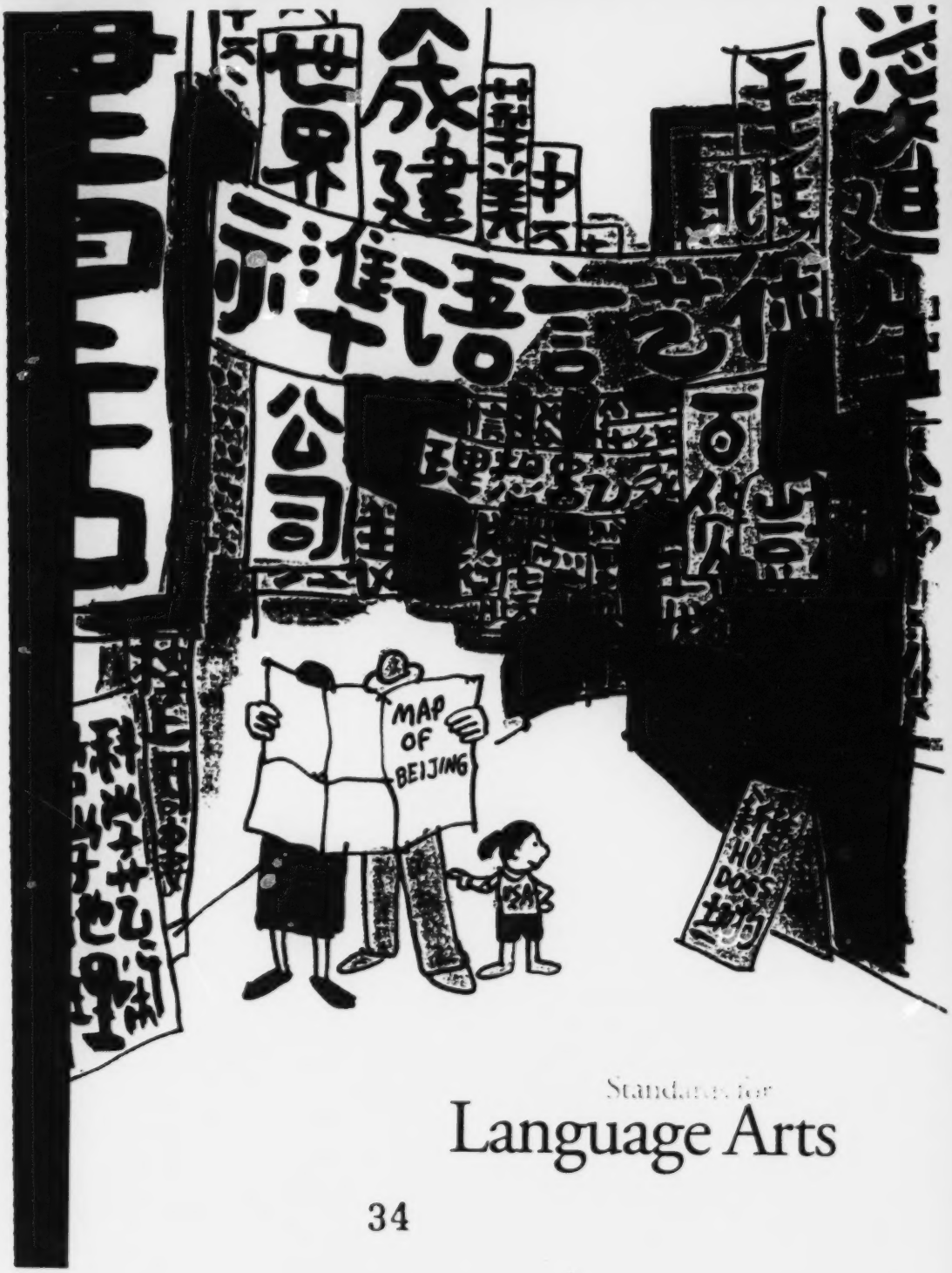
As students process information, they begin to formulate conclusions, organize evidence, and determine a form of presentation. Whenever they present their conclusions, they must be prepared to defend them against challenges from their peers. A third-year class, for example, might examine the

age of exploration, its benefits and problems, with a multimedia presentation. Elements of the presentation might include computer-generated maps and graphs showing changing geographic understandings, the movement of people, goods and wealth, and political boundaries. It might also feature a student-produced video documentary that offers testimony from primary sources using authentic images and voiceover readings of diaries, journals, and the like.

The Junior Academy history curriculum ends with the late seventeenth century in the Americas. But like all meaningful endings, it is also a beginning. Prepared now with a foundation of knowledge, skills, and experience in studying and understanding the past, Edison students have paved their own way for the future, applying what they've learned to new worlds both in and out of the classroom.

Assessment in Action

As part of their final assessment, students work together to prepare an exhibit of visual, audio, and written documents entitled "The Past in the Present." The year-end project involves students from all levels of the Junior Academy, gathering photographs, drawings, and other images of anything from modern clothing styles to contemporary buildings that show influences of the past civilizations studied in this academy. The exhibit might include local maps with highlighted place names that honor past cultures or document a link to a previous civilization. Or it might include contemporary documents and descriptions of institutions, such as the U.S. Constitution, the Hippocratic oath, or the Summer and Winter Olympics. Students describe those connections in individual captions and in a team-written exhibit catalog.



Standards for

Language Arts

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IN READING, STUDENTS WILL BE ABLE TO:

READ and comprehend a variety of self-selected and assigned materials from the Junior Academy reading list and other sources

ADAPT rate and style of reading to accommodate various literary genres—fiction, nonfiction (including expository and technical writing), poetry, plays, myths, and folklore

DEVELOP reading strategies such as inferring, generalizing, drawing conclusions, and identifying main ideas

DECODE vocabulary by identifying word roots, prefixes, and suffixes from Latin and other languages

READ aloud to aid comprehension, identify tone, bring characters to life, and share information or enjoyment with others

RECOGNIZE artistic elements (figurative language and sound devices) of a written work

IDENTIFY and analyze the literary elements (plot, character, setting) of each genre studied

INTERPRET literature using evidence from the text, prior knowledge, and experience

COMPARE literature from different times and places in order to identify common themes and elements

CONDUCT self-directed research on topics of interest in various disciplines, using a variety of media and print sources and preparing a database

IN WRITING, STUDENTS WILL BE ABLE TO:

WRITE in a variety of forms, including narrative, descriptive, informative, persuasive, expressive, and evaluative, adjusting approach to suit purpose

DEMONSTRATE command of grammar, usage, and mechanics as well as sentence structure, paragraphing, and overall composition

USE imagery to express ideas vividly

CRITICALLY ANALYZE a literary work using well-defined criteria, supporting opinions with details and examples

WRITE a formal research paper on a topic of interest using primary and secondary sources and including footnotes and bibliography
DRAFT, revise, edit, and proofread written work before publication
COMPLETE applications and write business memos and reports
USE a variety of media to publish materials
PREPARE a five-minute videotape report

IN LISTENING AND VIEWING, STUDENTS WILL BE ABLE TO:

ADJUST listening or viewing technique to suit various experiences (such as student-initiated discussions, interviews, school radio broadcasts, film and other media viewings, poetry readings, storytelling sessions, demonstrations, speeches, and panel presentations)
IDENTIFY elements of persuasion and appeal, evidence of prejudice or biases, and the difference between fact and opinion
ANALYZE public media, including radio and television
COMPARE and contrast literary and other media versions of a written work
TAKE notes efficiently and selectively
CONDUCT research before listening or viewing to increase prior knowledge

IN SPEAKING, STUDENTS WILL BE ABLE TO:

ADJUST speaking style to suit various experiences, such as debates, discussions, speeches, oral presentations, school radio broadcasts, demonstrations, or readers' theater
SPEAK compellingly on a topic, supporting a clear point of view with evidence, in prepared speeches and extemporaneous talks
MEMORIZE and recite with expression poetry selections of at least twenty lines
BRAINSTORM with classmates to exchange ideas, generate writing topics, or solve problems
LEAD discussions or run meetings on a topic of interest

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TELL stories representative of the oral traditions of various cultures, identifying common characteristics

IDENTIFY the differences between written and spoken text, comparing the techniques used in giving a speech with those used in writing an essay

ESTABLISH criteria for evaluating spoken text (both verbal and nonverbal elements) and use these to evaluate oral presentations, including their own

Standards for Speaking

Students at this age are intensely curious about how they fit into the world around them. The rapid physical growth they're experiencing often leaves students feeling a bit like Alice in Wonderland, going from knee-high to nine feet high in a matter of moments. "Who in the world am I?" wonders Alice, posing the question that middle schoolers may ask themselves. Alice's observation that life in Wonderland is becoming "curiouser and curiouser" captures the feelings of adolescents who find themselves in the middle of a world that seems to change a little more each day.

To help these curious students answer questions about their place in the world, the Junior Academy language arts curriculum provides maximum exposure to the great ideas, experiences, and traditions expressed in the written and spoken word. Students

explore this body of knowledge through literary classics, contemporary fiction, multimedia sources, and stories transcribed from the oral tradition, with an emphasis on literature connected to the study of Mesopotamia to Modern Times. The organizing concept for study is "then and now," which enables students to make connections between time-honored classics and contemporary literature.

Reading

There is no better motivation for reading than the desire to know or the pull of a great story, and students in the Age of Wonder indeed want to know and to enjoy a good read. In an effort to better understand themselves, they might read stories about others who are experiencing the transition from childhood to adulthood. Or searching for admirable figures to emulate, students might plunge into stories about real and mythical heroes, discovering more about themselves and their world within these exciting accounts.

Reading for middle school students is more than simply recreation or getting information. Students between the ages of 11 and 14 advance dramatically in their ability to comprehend more abstract reading material, and teachers in partnership schools provide them with books that exercise and challenge this ability as much as possible. When students read about the horrible deeds of Mr. Hyde, for example, they cannot help but wonder *why* the kindhearted, successful Dr. Jekyll went to such great trouble to transform himself into the monster Hyde. In order to make sense of Jekyll's behavior, students analyze the story in search of clues to his motives. They draw conclusions about Jekyll from these clues and apply their own knowledge of human nature

to his character. Comprehension and reflection are, in this case, simply part of the process of understanding and enjoying a spellbinding story.

Great works of literature keep readers wondering, laughing, weeping, or shuddering along with the characters, time after time. The fact that novels such as *The Strange Case of Dr. Jekyll and Mr. Hyde* continue to interest audiences today is evidenced by the films, plays, and musicals based on the century-old story. Many such Greats are introduced in the Junior Academy. Here is a sample of the works that students encounter.

THE GREATS IN LANGUAGE ARTS: CLASSIC WORKS

Alice's Adventures in Wonderland by Lewis Carroll
The Call of the Wild by Jack London
The Diary of a Young Girl by Anne Frank
Golden Fleece: And the Heroes Who Lived Before Achilles by Padraic Colum
Golden God: Apollo by Doris Gates
"I Wandered Lonely as a Cloud" by William Wordsworth
The Once and Future King by T. H. White
Old Possum's Book of Practical Cats by T. S. Eliot
The Prince and the Pauper by Mark Twain
Robinson Crusoe by Daniel Defoe
"The Secret Sharer" by Joseph Conrad
The Strange Case of Dr. Jekyll and Mr. Hyde by Robert Louis Stevenson
"We Wear the Mask" by Paul Laurence Dunbar

THE GREATS IN LANGUAGE ARTS: CONTEMPORARY WORKS

Ariadne, Awake! by Doris Orgel
"The Bean Eaters" by Gwendolyn Brooks
Dragonwings by Laurence Yep
Ishi, Last of His Tribe by Theodora Kroeber
A Jar of Dreams by Yoshiko Uchida
Julie of the Wolves by Jean Craighead George
Local News by Gary Soto
The Miracle Worker by William Gibson
Morning Girl by Michael Dorris
"My Father's Song" by Simon Ortiz
The River by Gary Paulsen
Roll of Thunder, Hear My Cry by Mildred D. Taylor
Where the Red Fern Grows by Wilson Rawls

Junior Academy students are excited about reading and are beginning to develop individual tastes in literature. Gradually selecting more of their own reading materials, students enthusiastically exchange ideas about what they read through discussion, role-play, collaborative literature-extension activities, journals, and creative and expository writing.

As they become more skilled, students learn to tailor the way they read to the genre of the work, its level of difficulty, and their own purpose for reading. They may linger over a poem in appreciation of its artistry, quickly scan a book jacket summary or a movie review, or reread the lines of a dramatic soliloquy aloud several times.

Students in the Age of Wonder also become more critical readers, gaining awareness of the author's purpose and craft, and recognizing how these elements influence a written text. They use analytical skills to construct meaning from more complex texts. Students also analyze the elements of each literary genre to understand how the parts work together. For example, in examining Mildred D. Taylor's *Roll of Thunder, Hear My Cry,* they discover that the novel's setting (rural Mississippi) is vital to its plot, which is

centered on a family whose strength is derived from the land. Finally, students compare literature across cultures and historical periods, recognizing that art reflects life and that certain feelings, relationships, and ideas are universal. Students also discover that the record of human history is filled with great stories.

Because students are beginning to think abstractly, teachers appropriately introduce the formal study of English grammar and Latin in the Junior Academy. At this stage in their development, students can comprehend linguistic structure, conventions of language, and etymology. They begin to see connections between the structures and vocabularies of the languages from which English developed and they learn to decode English words based on this knowledge.

Writing

As they immerse themselves in great literature, students become more discerning readers, eventually developing their own criteria for evaluating written text. Students learn how to apply these criteria to a work of literature when they write a criticism or review. They also turn the critic's eye on their own writing, using comparable criteria to assess, edit, and revise their work. Teachers emphasize the revision stage of the writing process, so that students can see how the act of writing clarifies their thinking.

Technology is a powerful partner in the writing process. It has been said that without the use of word processing, the writing process is only a theory. Computers free students from the laborious task of handwriting, which might otherwise limit the amount of writing they produce, and make revisions easier and less threatening. Students use word processors to connect their prewriting ideas, modify early drafts, and revise their work. They use desktop publishing software to publish their final versions in professional-quality documents that increase their ownership of their writing. Students also share their work with peers via the Common, which provides them with an immediate audience for writings such as book reviews and news articles.

By the Junior Academy, students have gained a degree of autonomy, which is reflected in what and how they write. They can generate their own writing topics and

choose a form that suits their purpose. They have learned to monitor their own writing process, making sure that their sentence structure is varied, their arguments are clearly presented, and their words are well chosen. And their study of Latin and other languages has further developed their skills in English grammar and usage.

Students' new sense of independence gives rise to experimentation in their writing. They might assume creative viewpoints, for example, or be more inventive in their use of imagery. They also might enjoy rewriting classic stories or fairy tales by changing the ending, updating the setting, or narrating the story from an unusual point of view. Students work independently when they write a formal research paper, choosing the topic, planning and conducting the research and database development, arranging the information appropriately, and preparing footnotes and a bibliography. In this concluding written work of the Junior Academy, students demonstrate a solid command of the English language in terms of grammatical correctness, coherence, and clarity of expression.

The Edison Project addresses students' concerns about the real world by preparing them to tackle functional materials.

The Edison Project addresses students' concerns about the real world by preparing them to tackle functional materials, such as applications, forms, and other documents. Junior Academy students want and need to know how to compose business letters and résumés; fill out applications for jobs, schools, scholarships, passports, and visas; draft proposals for projects or independent studies; and prepare spreadsheets and agendas for meetings and presentations. Such practical instruction gives Edison students the extra edge of confidence and experience that will distinguish them in future endeavors. Already familiar with multimedia tools, students learn how and when to use specialized programs and features, especially those they may be called on to use in the workplace. Students become comfortable using software programs and other media to prepare a formal presentation, whether for a language arts class or a future sales meeting.

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As students become more sophisticated listeners and viewers, they learn to adjust the way they listen or view to suit the purpose and the particular experience. Students might listen to a friend tell an anecdote more attentively than they would to a television or radio announcement, for example. Or a student conducting research for a paper on animation might view a videotape of a cartoon closely, several times in a row. Students learn to listen and view selectively, tuning in with extra alertness when the information is pertinent. At these points, note-taking skills become especially useful. Students realize that they cannot write down every word of an interview or speech, so they train themselves to take notes judiciously and efficiently.

Students also become more critical in their listening and viewing, attending not only to content but to context as well. They consider the speaker's point of view in order to detect biases or prejudices or to identify opinions misleadingly presented as facts. As audience members, students strive to be alert to emotional appeals or other persuasive tactics that a presenter might use. Students learn to view and listen more critically at multimedia presentations as well, distinguishing between the medium and the message and judging whether the medium effectively expresses the message.

With so many film versions of fine novels, stories, and plays available on videocassette, students have plenty of opportunities to compare works produced in different media. For Anne Frank's *The Diary of a Young Girl*, for example, students can compare the original book with the Pulitzer Prize–winning play and the George Stevens film. Such comparisons enable students to sort out the differences among the three media and to identify the strengths and weaknesses of each as a vehicle for Anne Frank's story.

The Edison Project encourages students to conduct research, whenever possible,

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Electronic Materials

Character Sketch I
(Humanities Software)
ClarisWorks (Claris)
The Complete Annotated Alice
(Voyager)
Write On! Intermediate
(Humanities Software)

before a listening or viewing experience. Even a small amount of background knowledge goes a long way toward engaging a student's attention and intellect.

Speaking

As Junior [illegible] students [illegible] skilled speakers and presenters, they recognize the importance of tailoring their speaking style to suit their purpose, content, and audience. Students find, for example, that the lighthearted, humorous tone that would be ideal for a reading of T. S. Eliot's *Old Possum's Book of Practical Cats* is inappropriate for the more serious poem "We Wear the Mask" by Paul Laurence Dunbar. Working collaboratively, students take turns speaking in front of classmates in order to provide valuable feedback about tone, volume, and pacing. Students also learn to regard the spoken and the written word as different media, acknowledging that certain techniques that enhance speech do not translate effectively to writing. Students discover that speakers can use vocal effects and body language to help make meaning clear, but writers must rely on text.

Students learn to speak logically and coherently on a topic, establishing a clear point of view and supporting it with evidence, both in prepared speeches and in extemporaneous talks. This ability enables students to lead discussions and chair meetings with competence and confidence. The confidence that students acquire empowers them as speakers, so that they can recite a poem with interpretive expression or tell a story using creative sound effects and authentic character voices.

By the end of eighth grade, students have had enough experience as speakers, multimedia presenters, and audience members to have established criteria for evaluating speaking in terms of content and delivery. Using these criteria to evaluate and refine their own use of the spoken word, students emerge as proficient communicators.

Students process the information they read, write, view, discuss, and listen to by connecting it with their own experience. The language arts curriculum helps students to do this by emphasizing the fact that many ideas and themes found in classic stories and

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myths are pertinent and applicable to our own lives. The organizational format "then and now" helps to underscore the accessibility and enduring nature of classics, especially in Greek myths, whose ageless characters feel afraid, fall in love, make mistakes, and feel remorse just as we do today. When middle schoolers revel in Theseus's triumph over the Minotaur or grieve at his abandonment of Ariadne, the responses alone attest to the universal appeal of great literature.

Assessment in Action

Each Junior Academy student compiles a personal literacy collection of his or her best work, which may include an annotated list of material read at school and at home; a writing journal; favorite written work; audiotapes of oral presentations and storytellings; videotapes of panel discussions, multimedia presentations, and readers' theater; photographs of dioramas and similar projects; or checklists on writing improvement. In addition, each student prepares a mid- and end-of-the-year evaluative essay or multimedia presentation on "then and now," discussing the progress he or she has made in reading, writing, listening, viewing, and speaking.

Teachers also prepare a portfolio with each student, including records of conferences; samples of written work; videotapes of multimedia and other presentations; audiotapes of poetry readings and other oral language activities; checklists of improvement in grammar, usage, mechanics, and composition; and photographs of artwork and other creative responses to literature. Some of the entries in this portfolio come from the student's personal collection. Combined, the two portfolios provide the teacher with valuable tools for the most authentic assessment of the student's competencies in English language arts.

IN WORLD LANGUAGE ARTS, STUDENTS WILL BE ABLE TO:

COMMUNICATE with people from other cultures in a variety of settings

DESCRIBE the geography, history, people, arts, and literature of other countries and cultures, ancient and modern

Standards for
Spanish

Standards for
Latin

IN SPANISH, STUDENTS WILL BE ABLE TO:

COMMUNICATE in Spanish with peers and teachers at increasingly complex levels

READ and listen to a variety of Spanish stories, songs, poems, and news materials

CONVERSE with native speakers using common expressions and simple sentences

DEMONSTRATE a beginning awareness of culturally appropriate language when interacting with native speakers

WRITE short, coherent Spanish compositions with increasing accuracy

IN LATIN, STUDENTS WILL BE ABLE TO:

DESCRIBE the influence of the ancient Roman world on the modern world and on the disciplines, including history, literature, and art

READ and comprehend beginning Latin materials

DEFINE and pronounce correctly and understand the meanings of basic Latin words

TRANSLATE common Latin phrases, abbreviations, and mottoes used in English contexts

USE knowledge of Latin roots and other languages to decode unfamiliar English words

Why do people communicate? How did language develop? What can languages tell us about the people who speak them? These are some of the questions students explore in the Age of Wonder as they learn that effective communication connects them to other people and other places.

Early adolescents have a strong need to communicate, and Edison's world language program helps them do so with greater competence and confidence as they refine their skills in reading, writing, speaking, and listening. Our approach to teaching languages emphasizes the skills students will need to participate in a world that is increasingly interdependent.

In this academy, students' early exposure to second-language learning through the Edison program begins to pay off in big ways. Students improve their English-language skills through study of Spanish and Latin by expanding their vocabularies, gaining a deeper understanding of grammar and syntax, and improving their abilities to decode unfamiliar words.

Studying world languages also helps students learn about cultures other than their own. In the Junior Academy, world language study is closely connected to the history curriculum, and students explore the geography, people, history, literature, and arts of ancient Rome and of countries where Spanish is or was the native language.

Spanish

In many parts of the country, instruction in a second language begins in middle school, a time when some students begin to feel reticent about pronouncing unfamiliar words in front of their peers. But students who have been with the Edison program since the Primary Academy have already studied a second language for six years. By the time they enter the Junior Academy, they are increasingly comfortable using Spanish. During these years, they begin to show creativity in their use of the Spanish language. Students who are new to an Edison school get the extra support and encouragement needed to "join in."

Edison language classrooms promote creativity by making available a wide range of innovative learning opportunities, including face-to-face interaction and E-mail. Simple stories and other print materials; songs; electronic media; maps; and real-world items such as menus, magazines, and comic books provide varied experiences for real-

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life use of their growing language skills. Students view and listen to videotapes of native speakers and they videotape their own conversations with teachers and classmates for review and criticism. And, of course, they make full use of audiocassettes to practice their developing skills.

Students' study of Spanish now becomes more formal, as the world language specialist begins to emphasize accurate grammar, spelling, and usage. We continue to stress conversation, promoting the skills students will need to converse with native speakers. To demonstrate their developing proficiency, each student must prepare an audio- or videotape of an informal conversation with the language specialist or a classmate. Students are given a list of possible topics in advance but do not know which particular topic will be assigned to them until just before their scheduled conversation. The language specialist varies the sophistication of questions asked during the conversations to reflect students' skill or proficiency levels and closely monitors the students' responses. Each student gets two opportunities to tape a conversation, then chooses the best demonstration to include in his or her portfolio.

We stress conversation, promoting the skills students will need to converse with native speakers.

Students apply their Spanish-language skills to learning in every area of the curriculum. For example, they read stories and compose simple patterned poems; they use Spanish maps to trace the development of Spanish culture; and they learn songs and dances, perform plays, and explore visual arts all drawn from the Spanish-speaking world. More proficient students may write research papers or give oral presentations on topics explored in other subject areas. In addition, these students develop their technical language skills by summarizing and paraphrasing the main ideas of stories and news reports that they have read, listened to, and viewed.

As previously indicated, the Edison Project recognizes that many students may enter the Junior Academy with little or no knowledge of Spanish. These students receive special tutorial assistance from teachers and other students in order to help them acquire the basic Spanish skills they need to participate in class activities.

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Teachers and parents also work together to determine and monitor the needs of non-English-speaking students. Special assistance is given to each new and returning ESL student, in an appropriate environment. Instruction for beginning Spanish speakers and ESL students is content-based, that is, linked to the curriculum for this academy and paced at appropriate levels so that each student can be prepared to participate in class projects while working toward achieving the academy standards. Of course, students who demonstrate advanced language skills may work toward the standards for the next academy whenever they are ready.

Latin

The study of Latin is an important part of students' experience in the Junior Academy. Edison's innovative Latin program is taught by a specially prepared English teacher as well as a world language specialist and is integrated thoroughly with the history curriculum and many of the academy's intensives. The program provides a firm grasp of basic Latin vocabulary, language structure, and literature in translation, which enhances students' understanding of English and their appreciation of Roman culture.

Because nobody's first language is Latin, Edison's commitment to teaching this language is a positive force for getting students to tackle a new area together. All students in the Edison system, whatever their first language, come to Latin without prior knowledge and begin their study on an equal footing. As students pursue their study of Latin, they develop a deeper understanding of the structure of language, which may enhance their writing, reading, and spelling skills and expand their vocabulary. They also become familiar with mythological references and Latin phrases used in English

ACTIVITIES

BALLADS AND BEYOND

When Ms. Maves introduces a Spanish ballad, her students immediately see connections among the languages they are learning. Students learn to sing the ballad in both Spanish and Latin, switching from one language to the other for each verse. In a related art project, the students study the ancient art of fresco painting and use lyrics from the ballad to inspire a mural design. In painting their mural on white butcher paper, the students use the same vivid colors that have endured in the scenes painted in Pompeii.

NUEVOS AMIGOS

After conferring with their parents, Mr. Phelps has decided that for the next two weeks Karen and Carlos will be a tutor-team. Karen knows she needs extra practice speaking in Spanish and has agreed to have Carlos, whose first language is Spanish, help her improve her Spanish conversational skills. In return, Karen commits to helping Carlos practice his English vocabulary skills and assists him when participating in daily class activities.

and develop the ability to unlock the meaning of new words through the study of word roots, prefixes, and suffixes.

Students learn about Latin through a state-of-the-art approach that makes full use of listening, speaking, reading, and writing as students learn the language. For example, students may read an account of a Roman family. Their teacher first presents the story orally, using accompanying visuals. Then, through oral repetition, students assimilate the Latin structures, enabling them to read Latin right from the beginning of their study.

Also from the beginning, the teacher focuses on the Latin word roots and derivatives in the English language, proving to students that Latin is not such a dead language after all. From basic beginning vocabulary in Latin, students learn English words such as ***pulchritude*** (from ***pulchra*** meaning "beautiful") and ***puerile*** (from ***puer***, meaning "boy"). As a bonus, students also become more interested in using the dictionary, not only to look up words, but also because they've developed curiosity about language and are eager to research word roots.

Students' study of Latin and the ancient Roman world relates naturally to all areas of the curriculum.

Students' study of Latin and the ancient Roman world relates naturally to all areas of the curriculum in this academy. And as they study the ancient world, they make connections to their contemporary world by comparing, contrasting, and analyzing different aspects of civilization. For example, in one intensive project, students read David Macaulay's *City* as the starting point for an investigation of city planning undertaken by the Romans. Then they compare the grid pattern of ancient Roman cities with grids of contemporary U.S. cities, such as New York City. Through the language arts curriculum, students read simple passages, in Latin, from the famous speeches of ancient orators, then write their own speeches in English on the current issues that matter to them. In history, students study Roman imperialism, colonization, and exploration and compare these to contemporary exploration of the new frontiers—space and the ocean floor. And in character and ethics, students investigate the belief systems of the ancients.

At a time in their lives when communication plays a powerful role, Edison's world language program goes a long way toward developing students' confidence in their language abilities. Their ongoing study of Spanish and their introduction to Latin in this academy further prepares them to live and work in an increasingly politically and economically interdependent world and to develop the cultural understandings that will serve them well throughout their lives.

Assessment in Action

The students in Mr. Morrison's language arts class are brainstorming a list of Latin mottoes, such as *E pluribus unum and Semper fidelis.* Mr. Morrison then shows the students seals from various colleges and state universities, along with their Latin mottoes. The students are able to determine the meanings of many of the mottoes, such as Harvard's *Veritas* and Virginia Polytechnic University's *Esse quam videri.* "How does the motto reflect the mission of the college or university?" Mr. Morrison then asks. "What significance might the motto have for a member of that institution?" After a wide-ranging discussion of these questions, the students design their own seals or crests. Finally, the students write mottoes, in Latin, to go with their crests, which eventually become part of their final portfolios.

Standards for

The Arts

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IN THE ARTS, STUDENTS WILL BE ABLE TO:

ANALYZE and interpret the historical and cultural significance of major artworks and artists of periods being studied

COMPARE and contrast the functions, uses, and roles of the arts of cultures being studied

RECOGNIZE diverse artistic styles and genres, their place in art history, and their impact on contemporary society

EVALUATE the work of peers and professionals in each artistic discipline through live and video performances

IN MUSIC, STUDENTS WILL BE ABLE TO:

SING, alone and collaboratively, an expanded repertoire of cultural, popular, and historical selections with attention to expression, breath control, tone, and confidence

PERFORM, alone and collaboratively, an expanded repertoire of selections on the recorder or other instrument, with an increased emphasis on pitch, phrasing, tone, dexterity, and style

IMPROVISE, alone and collaboratively, original musical patterns on a given melodic line, rhythmic structure, or harmonic pattern

COMPOSE short pieces using traditional and nontraditional sound sources, like voice, the recorder, and computer-generated instruments, incorporating correct notation and structure

READ music with simple melodies, patterns, and structures, utilizing traditional and electronic methods

EXPLAIN the role that individual and combined sounds play in the overall effectiveness of a work

IDENTIFY elements of music such as sound generation and modification, pitch relationships, rhythmic patterns, melodic and harmonic structures, forms, texture, tempo, dynamics, timbre, and color

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Visual Arts

Drama

Dance

IN VISUAL ARTS, STUDENTS WILL BE ABLE TO:

SELECT a variety of techniques, media, and processes to produce original works of art, including painting, drawing, sculpture, photography, print making, film, video production, and computer-generated images

USE traditional crafts processes from diverse cultures, such as quilting, weaving, and batik

DEMONSTRATE knowledge and practice of the artistic process by building a portfolio of completed works

IDENTIFY and use more advanced design elements, such as light and shadow, perspective, pattern, and composition

IN DRAMA, STUDENTS WILL BE ABLE TO:

STAGE a full-scale production including the technical elements of theatrical production, such as direction, scenery design, costuming, lighting, sound, props, and makeup

DEVELOP original scripts, emphasizing beginning, conflict, resolution, and ending, and incorporating basic literary devices, characterization, and dialogue

ADAPT scenes from classic and contemporary literature

DEMONSTRATE basic acting skills, such as articulation, vocal and movement techniques, and emotional expression to convey a character, concept, or situation through one-act plays, poetry readings, monologues, soliloquies, pantomime, and comedic sketches

IMPROVISE scenes to communicate concepts, feelings, and situations

PROVIDE ideas for dramatic productions through brainstorming, primary sources, interviews, and independent research representative of periods and cultures being studied

IN DANCE, STUDENTS WILL BE ABLE TO:

USE body movement with emphasis on strength, flexibility, agility, balance, grace, endurance, and alignment

IMPROVISE abstract thoughts, feelings, and ideas into gestures and movement phrases individually and in response to the movement of a partner or group

EXPLORE spatial concepts and designs through individual and group movement, emphasizing elements such as time, energy, direction, and range

PERFORM original, traditional, and historical dance sequences using appropriate theatrical support, including costumes, props, music, and lighting

CHOREOGRAPH short dance sequences using the elements of form, such as balance, harmony, transition, and unity, and demonstrating ability to critique their work and the work of others

Art, which by its very nature encourages reinvention and renewal, directly parallels what is occurring in students' lives. At a time when they are trying to understand the world more deeply, art serves as a bridge that connects them to their immediate environment and to their place in history.

The Junior Academy arts program is integrated closely with the other subject areas and continues the balanced discipline-based and performance approaches that students practiced in the earlier academies, including history, criticism, aesthetics, and production. Students study the arts of diverse cultures and civilizations, making connections to their own lives and analyzing the contributions these societies made to the way people live today. In an intensive study called "The Image of Humanity: Looking Across the Centuries," students investigate and discover how artists have represented people over the course of time. They compare the monumental depiction of people in

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ancient Egyptian sculpture with the vision of ideal beauty representative of the classical period in ancient Greece. They examine the elegant realism seen in Chinese sculpture and the highly stylized iconography of the Middle Ages. This intensive culminates in an examination of how people are portrayed in contemporary art and media and the creation of self-portraiture in a variety of techniques.

Students ponder the ingenuity and design of the Seven Wonders of the Ancient World, compare them to wonders of the modern world such as the Statue of Liberty or the Eiffel Tower, and predict what contemporary structures will be considered "wonders" by future generations. They learn that the arts have an important place along the time line that each student in this academy creates, serving as the glue that keeps the key events, people, and places in an organized and logical framework and providing an understanding of the big picture—how all people have the arts in common and have a contribution to make. That sentiment is reflected in the theme song for this academy, the first two verses of "Seed to Sow" by Michael W. Smith (© 1990 O'Ryan Music, Inc.), sung with English and African lyrics. An excerpt appears below:

KIMU NKIMAANYI
BULI MUNTU ALINA ENSIIGO
OMUTIMA GWO GUKULUNG 'AA MYE

WE ALL ARE PIECES OF THE WHOLE.
WITH DIFFERENT FEELINGS TO EVOKE.
GIVING DISTINCTION TO THE ROLE.
DIFFERENT PLAYERS. DIFFERENT STROKES.
BUT LET ME TELL YOU 'BOUT ONE THING I KNOW.
EVERYBODY HAS A SEED TO SOW.

Music

Up to this point, students have explored and synthesized the information that has created a strong foundation in basic music education. It's now time to start filling in the details and making the serious commitment required to take the next step toward music literacy. When students reach the Junior Academy, they are beginning to see the direction they will take in their study of music. Some may decide to pursue the study of a particular instrument outside of school through private lessons, and all students continue to improve their skills on the recorder, which become increasingly sophisticated at this level. They also continue their involvement in the Edison signature singing program, participate in organized vocal groups and small instrumental ensembles (where available), and perform regularly before peers and parents.

Students are challenged to determine the relationship between music of the past and present, analyzing how music has evolved into what they hear today. While studying the Middle Ages, students listen to traditional Gregorian chants, examine their historical and cultural significance, and identify why this music has re-emerged and become popular. They trace the musical history of current styles like reggae and hip-hop to uncover how today's music is built on that of the past. They also examine African music, listening to the sounds of traditional instruments and comparing these

ELECTRONIC MATERIALS

The Anatomy of Music (Tom Snyder)

The Orchestra: The Instruments Revealed (Warner New Media)

Practica Musica (ARS Nova)

SongWorks (ARS Nova)

The Theatre Game (intellimation)

RECORDED MATERIALS

Dancing (Thirteen/WNET)

Murmurs of Earth: The Voyager Interstellar Record (Random House)

styles with contemporary works by artists such as Hugh Masekela, Johnny Clegg and Savuka, Miriam Makeba, and Ladysmith Black Mombazo. We stress production through improvisation, theory, and practice, and we encourage students to collaborate with and offer informed and constructive criticism to fellow academy musicians.

Technology begins to play a larger role at this level of the Edison music program. Students' greater intellectual development allows them to make abstract connections and delve into more complex problems. Creativity through composition is greatly assisted by technology. Students compose and adapt existing work with the aid of the computer and with software that enables them to express their musical thoughts freely and with great versatility. The computer offers students a large repertoire of sounds to explore. Technology, combined with students' thirst for discovery, enables these musicians to venture into new and exciting musical territory.

Visual Arts

Students in the Junior Academy participate in the visual arts with a heightened sense of curiosity and experimentation and with a greater ability to analyze and interpret what they see. They are able to look beyond the surface to examine artistic concepts and objects from multiple perspectives. They draw on historical knowledge and information on technique to produce their own artwork. The artistic process offers students tangible rewards for their creative inspiration, concentration, and execution.

Great periods in history provide the inspiration for students to create exciting and original pieces of art. In one art class, students analyze the features of Gothic architecture in conjunction with their larger study of the Middle Ages. They view images of Gothic cathedrals, like Notre-Dame and Chartres, examine the iconography present in the sculptural details, and respond to the information in their journals. The next step is a hands-on one. Prepared with the necessary historical information, students create original artwork inspired by Gothic stained-glass windows. Some students choose the pointed arch, some the quatrefoil, and some the awesome and symbolic rose window

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design. They draw on black poster board the intricate tracery that forms the interior of the window, cut the shapes with mat knives, and back them with brightly colored tissue paper or cellophane. As a final step, students hang their creations in the highest windows of the classroom, creating a medieval quality of illumination. Just as the sculpture of the ancient Greeks inspired the young Michelangelo to develop his own personal style, students in the Junior Academy apply the lessons of the past to create their own unique artwork.

By studying great works of art across history, students hone the visual skills that they will need to compete in a world becoming increasingly dependent on visual images. Students explore in depth functional art forms common to a variety of cultures, such as masks and mosaics. With the help of technology, students travel to distant lands to examine, in detail, great works of art: They tour the Valley of the Kings where pharaohs once ruled or wander the Acropolis in Athens—all without leaving the classroom. Computer software and videodiscs allow students to examine reproductions of great art historically, technically, and aesthetically; this complements firsthand viewings at local museums, studio field trips, and in-class workshops. By studying visual arts as the records of civilization, students draw conclusions about what has come before them and place their own creative expression within a logical context.

Drama

Drama can provide an outlet for exploring the experience of becoming an adult. The study and practice of drama help students gain self-confidence and poise, at a time when many students find it awkward just to be themselves.

As in the music program, students in the Junior Academy encounter and perform a vast repertoire of dramatic works, such as ceremonial drama and selected works from contemporary playwrights, that throw a spotlight on issues of importance to students of this age. Drama comes to life as students continue their study of "Heroes: Then and Now." From Hercules to Joan of Arc to Martin Luther King, Jr., students have many opportunities to examine the essential qualities and characteristics of heroism

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through great works of dramatic literature, and they draw parallels to heroes that they encounter in their own lives. Via video, they have front-row seats at fine dramatic performances and produce a short video drama based on a historical period of study. For a generation whose primary exposure to drama is through television and movies, critical viewing skills are stressed so students can make wise choices in a media climate often dependent on "reality-based" and recreational programming. Likewise, by attending live dramatic performances, students can compare theater and television, their similarities and differences as well as their advantages and disadvantages. They recognize how the elements of theater are embedded in the ceremonies of life events, such as weddings and graduations, as well as in live coverage of legal proceedings and political debates. By creating their own work and viewing a wide range of live and recorded performances, students begin to view drama as an art form that educates, informs, and entertains and to realize the aesthetic value of dramatic expression.

Dance

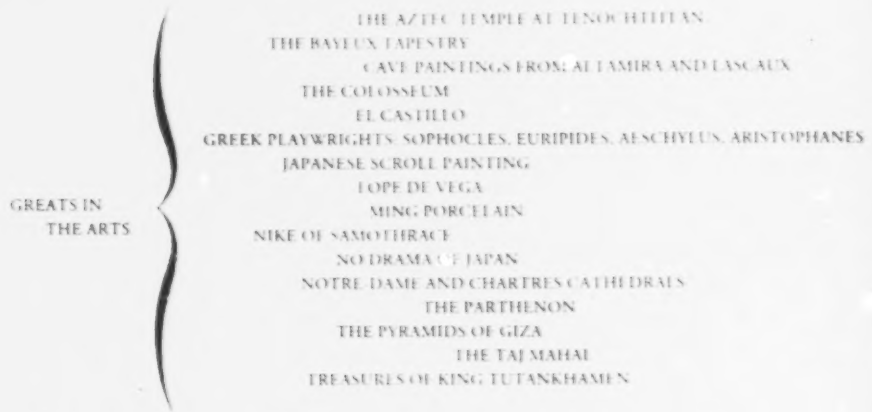
This academy coincides with the time of first school dances. Students are aware of the latest dance styles and begin to express their personalities and identities through creative movement. We recognize the importance some students place on social dance and integrate this natural interest into the curriculum. Students realize how dance promotes fitness, poise, flexibility, strength, grace, and control—all things adolescents commonly struggle to attain. The requirements of dance—practice and discipline—help students develop sound habits that are beneficial throughout their lives. These requirements form the foundation of dance instruction in the Junior Academy.

Students examine dance as part of their study of ancient civilizations and ask such questions as: Why do people dance? What purposes does dancing serve? They examine their own dance forms in relation to styles that were popular at different times in history. They study how many world cultures use dance to convey abstract ideas. By creating original dances representative of their generation and practicing traditional works from other cultures, students begin to make connections with human history.

Adolescents want to know that they count and that their efforts are recognized by those around them. The arts can foster their imagination, encourage their self-expression, and open the door to the wonders of history. Through the production of original work and the examination of a wide range of cultural art forms, students begin to grasp the continuity of civilization and their link to the past, present, and future.

Assessment in Action

Mr. Wong's class has been studying traditional dramatic forms from different countries, and students have decided to produce shadow puppet theater in an assessment that combines visual art, music, dance, and drama. They've looked at slides and watched films of actual shadow puppet performances to get "the flavor" of the art form, and they have discovered that many cultures use this form of theater to tell stories of heroes and villains, a theme that students have been exploring throughout this academy. Over the course of two weeks, students work in cooperative groups to adapt stories into original scripts, assign roles and backstage duties, design and create the shadow puppets, build the sets, choose musical accompaniment, choreograph, and rehearse their plays. This intensive work culminates in the final performance, which will be videotaped and added to each student's art portfolio as well as the school's video collection.



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Standards for
Mathematics and Science

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IN MATHEMATICS, STUDENTS WILL BE ABLE TO:

COMMUNICATE mathematically by discussing, writing, reading, and listening to mathematical ideas

USE computer spreadsheets, databases, graphing programs, and simple simulations to explore and represent mathematical ideas and visualize complex problems

RECOGNIZE the need for estimated or exact answers and use the best approach (mental math, paper and pencil, calculator, computer) to solve problems

SOLVE a variety of complex problems in math and in the real world using arithmetic, algebraic, geometric, statistical, and computational methods

NUMBERS

IDENTIFY and solve problems using rational and irrational numbers, integers, exponents, and whole numbers

REPRESENT and use numbers in a variety of equivalent forms

DEVELOP concepts of relationships among whole numbers, integers, rational numbers, irrational numbers, and real numbers

COMPUTE accurately using whole numbers, fractions, decimals, and percentages, by hand or with a calculator

APPLY understanding of grouping arrangements, such as grouping by twos or by twelves

DEMONSTRATE understanding of the operations and their properties and show how they extend to different number systems and grouping schemes

RECOGNIZE properties of number systems

MEASUREMENT

EXPLAIN abstract properties and units of measure, as well as combinations of units, such as miles per hour, converting measurements as needed for efficient use

USE a variety of measuring tools such as protractors, micrometers, and directional compasses accurately

DEMONSTRATE understanding of ratio and proportion through work with scale drawings and models

Mathematics

GEOMETRY

RECOGNIZE, classify, measure, and transform plane and solid figures

OBSERVE, analyze, and construct models of two- and three-dimensional figures and explain their properties

EXPLAIN and apply special properties of triangles, including the Pythagorean theorem and trigonometric ratios

PATTERNS AND FUNCTIONS

IDENTIFY, analyze, and generate patterns in different situations, including in number sequences

EXPRESS functional relationships through a table, a set of points on a coordinate graph, or an algebraic formula

DATA

APPLY concepts of variability and chance, probability, sampling, predictions, combinations, and simulations

PRODUCE, organize, interpret, and use data

USE statistical methods to describe, analyze, evaluate, and make decisions

ANALYZE the results of statistics reported in the media

SUMMARIZE information through appropriate use of mean, median, mode, and range

ALGEBRA

DEMONSTRATE understanding of equivalence among fractions, decimals, and percentages and between algebraic expressions

CONSTRUCT mathematical expressions that describe relationships

EXPLAIN variable and function

DESCRIBE and represent relationships using tables, graphs, and rules

WRITE and solve algebraic equations

GRAPH equations and identify slope, intercepts, and roots

Mathematics

In the Age of Wonder, students discover the practical power of mathematics. Through high-interest projects, activities, and investigations, they learn that by drawing on the ideas, tools, and techniques of mathematics they can strengthen their thinking, communicate with greater precision, make important connections across the curriculum, and find solutions to perplexing real-life questions and problems. At this level, we prepare students for the abstractions of the secondary math program and lead them toward a deeper appreciation of the power and beauty of mathematical ideas.

The Learning Environment

Junior Academy math classrooms are lively places in which teachers are facilitators and students take more responsibility for their own learning. A variety of real-life tools and materials help students put their mathematical thinking and ideas to work in meaningful ways.

Because students at this level are just beginning to think abstractly, much of their exploration still involves the use of manipulatives. Number cubes, pattern blocks, decimal models, algebra tiles, compasses, counters, marbles, spinners, and tape measures all help students connect abstract ideas to concrete situations.

Computers and calculators are important staples of the math classroom. Students use technology for fast and efficient computation, for checking the results of paper-and-pencil calculations, and for visualizing and exploring more interesting and complicated problems than otherwise is possible. When freed from the labor of paper-

and-pencil calculations, they can find answers to "What if?" questions, test their mathematical strategies, and function more like real mathematicians. Students manipulate data using spreadsheet packages, cement their understanding of concepts through interactive software, and benefit from the cooperative atmosphere that technology promotes. Function plotters, statistical simulations, electronic manipulatives, and computer-based geometry drawing programs are just a few examples of the many types of technology students use regularly in this academy.

Fiction and nonfiction books, encyclopedias, almanacs, and other reference materials round out a learning environment designed to foster questioning, exploration, and investigation. Students collect data and access information using a variety of sources—from texts to sample electric bills.

Project-Based Learning

Cooperative projects and individual investigations form the core of the mathematics program. Generally, students work in mixed-ability groups for collaborative work, which requires them to apply mathematical ideas to real-world situations. Using manipulatives, technology, literature, logbooks, reference materials, and other tools of the trade, students investigate the mathematics inherent in topics ranging from weather patterns to walls.

In one project, students investigate several popular board games to determine what makes a game "fair." Teams of students examine each game to answer questions such as: Does each player have an equal chance of winning? How does the design of the game board affect the outcome? Is there a strategy for winning? The teams then work together to design their own fair game. Finally, the teams exchange games and test each for fairness.

The content of the mathematics curriculum prepares students for the complexities of the secondary program. We build on concepts and ideas introduced in earlier academies but move students toward a higher level of abstraction and a developing understanding of variable, generalization, and informal proof. In the course of their investigations, students are exposed to powerful mathematical ideas, such as proportional relation-

ships, patterns and generalization, and multiple representations, which stress the connections among the various strands of mathematics and across the entire curriculum. By the end of the Junior Academy, students have received the background in algebra and geometry necessary for more advanced work in the Senior and Collegiate academies. All students are expected to master content in these areas:

Number Sense

Number sense continues to be developed through activities pertaining to operations, mental computation, numeration, estimation, number theory, and data management. Students investigate the realistic uses of numbers in everyday life, explore number patterns and number relationships, create alternative methods of calculation and estimation, calculate for a purpose, and solve realistic problems using a variety of approaches. Much of the students' work with numbers relates to their study of ancient history. Using *The Language of Numbers*, created by the Education Development Center, students invent, explore, and compare systems for representing numbers. Among other activities, they explore the Roman numeral system and compare it to our own, investigate the history of the Chinese abacus and analyze the properties it shares with our number system, and research the Maya number system as a language for representing numbers.

Measurement

Students relate measurement to everyday life using time, money, temperature, length, height, area, volume, capacity, and weight. Students have opportunities to apply measurement to other mathematics topics such as estimation, geometry, decimals, and fractions and to use measurement to answer questions about real problems. Measurement is integrated into all contexts and projects, with an emphasis on patterns and relationships.

Spatial Sense

Spatial sense involves the ability to visualize the motions and actions required to change the position, shape, and size of an object as well as the ability to analyze objects and to determine the effects of motions and actions. Students' spatial sense is developed

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ELECTRONIC RESOURCES

Algebra Connections
(Sunburst)
ClarisWorks
(Claris)
Geometric Supposer
(Sunburst)
Hands On Math
(Ventura)
Math Processor
(Computer Curriculum)
Math VideoKits
(Tom Snyder)

TEACHING MATERIALS

Futures With Jaime Escalante
(PBS Video)
Interactive Mathematics
(Glencoe)
The Language of Numbers, created by Education Development Center
(Heinemann)
Math Videokits
(Human Relations Media)
Patty Paper Geometry by Michael Serra
(Key Curriculum Press)
The Write Tool to Teach Algebra
(Key Curriculum Press)

through activities that encourage them to compare shapes and solids and describe their similarities and differences; make drawings of shapes and solids; use geometric and measurement terminology to describe objects; to visualize, predict, and verify the results of motions and actions on objects; and to explore geometric patterns. In one activity, students imagine that the world is completely two-dimensional, then determine if it more resembles the surface of a round table or the surface of a sphere.

Algebra

Students describe and represent relationships with tables, graphs, and rules; explore inverse operations; analyze functional relationships; and understand and appreciate the need for fractions and decimals as well as whole numbers. They also develop an understanding of variables, expressions, and equations; use informal methods to solve linear equations; and represent numerical relationships in one- and two-dimensional graphs.

Geometry

Students identify, describe, compare, and classify geometric figures; analyze properties of geometric figures; explore geometric relationships and transformations of figures; and recognize and appreciate geometry in the world. In a project linked to their study of early civilizations, students identify geometric shapes in ancient architecture, then create scale models of those buildings.

Data

Students collect, organize, and describe data; develop questionnaires and surveys; construct tables, charts, and graphs for managing data; use different types of graphs and compare their suitability in various situations; recognize the importance of properly interpreting pictorial information; and use data to solve problems.

Probability and Statistics

Students create experimental and theoretical models of situations involving probabilities, model situations by constructing a sample space to determine probability, compare experimental results with mathematical probability, make predictions based on experi-

mental or theoretical probability, and develop an appreciation for the persuasive use of probability in the real world. In a long-term project involving data collected from insurance companies, students determine how the probability of different natural disasters affects homeowners' insurance rates in their community.

Communicating Mathematically

When students write, speak, read, and listen to mathematical ideas, they clarify their thinking and cement their understanding of important math concepts and skills. And because mathematics demands precision of thought, speech, and writing, students hone their language arts skills at the same time.

During their investigations, students write about their findings, summarize their understanding of mathematical ideas, and list questions that may lead to further inquiry. In addition, students regularly deliver oral presentations to their classmates, teachers, and parents, in which they explain the outcomes of their investigations and describe their approaches to solving problems.

Students have additional opportunities to communicate their mathematical understandings through creative projects that extend classroom learning to their homes. Often these activities involve the entire family and may take several days to complete. For example, in one assignment, students work with family members to create a graph showing population growth in their community since the turn of the century. Families use their home computer to construct the graph and may choose to represent the data in various ways. Homework activities like this involve parents in the learning process, give students a chance to apply their math skills, and connect directly to concepts students are exploring in class.

Students discover that mathematics is a practical tool they'll use throughout their lives.

The Junior Academy mathematics program answers a question students often pose at this important stage of their development: What does math have to do with my life? Through engaging projects that

allow them to grapple with real-world situations, students discover that mathematics is a practical tool they'll use throughout their lives.

Assessment in Action

Students are expected to perform ably on a variety of assessment tasks, including open-ended problems, informal observation and questioning, multiple-choice quizzes, performance assessments, and standardized tests. In addition, students regularly conduct self-assessments and maintain their own electronic portfolios. These portfolios contain self-selected samples of work that illustrate their growing understanding of mathematical concepts and their developing skills. The following assessment task illustrates how students might be expected to demonstrate their developing skills by solving a real-world problem.

Imagine that your house in the Junior Academy has just been awarded $1,000 from a local philanthropic organization. The only stipulation is that the money must be used by the academy library. You must investigate the reading habits of a random sample of students in the Junior Academy to determine how the money should be spent. Your survey should include questions such as: How do you use the school library? Do you read more fiction than nonfiction? What magazines do you read? Are you interested in software or on-line data retrieval services? When developing the questionnaire for your survey, be sure to consider how many students should be sampled, whether teachers should be included, and what makes a sample random. When your group has collected the necessary data, prepare a report proposing how the money should be spent. Be sure to use your data to justify the proposal.

THE GREATS

The place-value system
Irrational numbers
The Cartesian coordinate system
The Pythagorean theorem
Zero
Algebra

IN SCIENCE, STUDENTS WILL BE ABLE TO:

DEMONSTRATE a substantial degree of organized knowledge about nature and technology by using appropriate language to describe and explain phenomena such as protective coloration and rocket propulsion

EXPLAIN key concepts, laws, and theories of the sciences, including the concept of force and the laws of inheritance

USE key concepts, laws, and theories to organize and explain natural phenomena or technology, such as using the "front" concept to explain weather and the laws of magnetism to explain sound reproduction in audio speakers

PERFORM arithmetic operations and calculations needed to explore scientific problems and phenomena, including working with percentages, ratios, and proportions; simple probability and statistics; graphing; exponents and scientific notation; and handling units algebraically

PERFORM extended laboratory and simulated investigations using necessary skills such as generating hypotheses, designing experiments to test these hypotheses, properly using appropriate materials and equipment, accurately recording data, displaying data in graphical formats, interpreting data, and communicating conclusions clearly

USE advanced process thinking skills, such as modeling, analyzing, analogical reasoning, and inferring, in problem solving and investigations

USE a range of reference materials, including electronic sources, to investigate scientific questions

APPLY scientific concepts and methods to meet a challenge or to solve a community problem, such as performing an energy audit of the school and proposing ways to save energy

EXHIBIT scientific attitudes, appreciations, and dispositions in their lives, such as an appreciation for the power and excitement of scientific knowledge and reasoning and a disposition to rely on data

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What causes earthquakes? How do airplanes stay in the air? As students' questions about science grow more complex in the Age of Wonder, they learn that questions about the natural and physical world have perplexed people since the earliest civilizations. In conjunction with the history curriculum, they learn that the roots of modern science can be found in the ancient world. At the same time, they discover how modern scientific studies of ancient artifacts and ancient climates have solved long-standing mysteries about early civilizations.

Science

Students have already made many of their own discoveries about how the world works, but the Junior Academy curriculum provides them with more formal intellectual structures for the knowledge they've been acquiring since the Primary Academy. At the same time, it motivates them to apply scientific thinking and concepts in their daily lives. For these reasons, science at this level is about connections.

We connect the interests and sensibilities of early adolescents with the increasingly complex and important world of science and technology. We encourage

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students to recognize the underlying connections between the diverse phenomena they observe: between Earth's past and present state; between themselves and nature; and between the science they explore and the society, communities, schools, and families in which they live.

We also draw connections among the various fields of science and to other areas of the curriculum. For example, students study the history of science and technology through the history curriculum, they encounter issues of human health in their physical education classes, and they develop quantitative skills needed in science through the math curriculum. We also connect science to the technology students will use in the future—at work and during their leisure time.

Integrated Thematic Studies

Extended integrated thematic studies provide students with some of science's most powerful conceptual tools for organizing and expanding their knowledge of the natural world. During each year of the Junior Academy, students typically engage in two semester-long studies that integrate major concepts from various sciences, as in the following examples:

How
How Are Energy and Matter Connected?
How Is Earth Changing?

Integrated thematic studies each center on one major topic. However, each study contains a variety of other themes that cut across topics. Consider, for example, the concept of cycles, which applies to individual life cycles, seasonal cycles, and the water cycle to name just a few related themes.

These integrated thematic studies ensure that by the end of the Junior Academy, students have gained a fundamental understanding of the major theories of life science (evolution and cell theory), earth science (tectonics and cosmology), and physical science (the particulate nature of matter and transformations of energy). They'll also understand the following big ideas about science:

THE SCIENTIFIC DISCIPLINES HAVE A COMMON GROUNDING IN METHODOLOGY AND INQUIRY.

SCIENCE IS BOTH HISTORICAL AND EXPERIMENTAL.

SCIENCE AND TECHNOLOGY ARE DIFFERENT BUT INTERTWINED.

SCIENTIFIC THEORIES ARE FIRMLY BASED ON OBSERVATION AND ARE MODIFIED OR ABANDONED WHENEVER NEW EVIDENCE SHOWS THEM TO BE UNTENABLE.

The Human Body: An Integrated Study up Close

Students' study of the human body begins with film clips showing people from all over the world engaged in a wide range of activities: Olympic athletes in action, doctors performing medical procedures, astronauts in orbit, indigenous rain forest peoples, Inuit in an icy Arctic environment, physically challenged people, identical and fraternal twins, senior citizens, families, and different types of people performing a variety of activities.

After the films, students break up into small groups to brainstorm questions they have about the human body. The students write their lists on large sheets of paper, which teachers collect and sort into groups of related questions. The teachers then edit and add to the questions until they've created seven sets of related questions, with titles such as "Sports and the Human Body" and "Heredity and Environment." The following day, the groups review the lists and decide which questions they'd like to pursue.

During the first segment of the course, the seven teams research the questions listed on their inquiry sheets and use guided inquiry forms to record their findings. They read books, magazine and newspaper articles, and encyclopedia entries; they interview parents, teachers, doctors, nurses, chiropractors, athletes, public health workers, and nutritionists; they consult computer databases and view videos, photos, videodiscs, and CD-ROMS; and they discuss among themselves and with other groups.

While the students are pursuing their inquiries, the science teacher provides a systematic overview of the structure and functions of the major human body systems: skeletomuscular, sensory/nervous, digestive, respiratory, circulatory, excretory, immunological, endocrine, and reproductive. This overview is provided via daily 10- to 15-minute illustrated lectures, accompanied by an outline with reading and viewing references and diagrams for students to label. Students are expected to apply what they learn about these systems to their inquiries.

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At the end of the inquiry, the groups present their findings to the rest of the class. Each group makes a different type of presentation using a variety of media, including video, computers, printed handouts, photographs, charts, music, and audio recordings. In addition, each group distributes copies of their completed guided inquiry forms, which they also make available to other students via the computer. Eventually, students submit portions of their presentations to the *Edison Encyclopedia of Ideas*.

Following the presentations, all students take a lab practical exam in which they identify numerous organs, bones, and other body parts on life-sized models and charts.

During the next segment of the course, the science teacher uses the students' strong interest in and growing understanding of the human body to probe the underlying causes of body structures and functions. Using a combination of short lectures, lab investigations, computer simulations, homework assignments, and guided classroom discussions, she leads students through an in-depth study of the cell, including the structures and functions of cell parts, cell chemistry, cell transport, homeostasis, cellular metabolism, cellular respiration, photosynthesis, mitosis, and meiosis. This serves as an introduction to the formal study of biology in the next academy. For now, though, it is less important for students to remember every detail or fully understand every process than to recognize that macroscopic structures and phenomena have microscopic causes and explanations.

> Students see the astonishing extent to which present-day society has been shaped by past scientific discoveries.

At the conclusion of their study, students take a written exam that includes labeling diagrams, writing chemical formulas, matching terms with their definitions, and explaining in short essay form the purposes and processes of cellular respiration, photosynthesis, mitosis, and meiosis. The primary purpose of this exam is to provide The Edison Project with an indication of the students' degree of retention and understanding of the more formal content of life science at this point in their school lives.

In one creative homework assignment that connects to students' study of the ancient world, they research the Latin names for certain body parts and identify the Greek roots in certain bodily diseases, such as hepatitis and osteoporosis.

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During the final segment of the course, the class applies many of the concepts they have learned about the human body and about the underlying nature of cells to the important study of heredity and genetics. Working principally through labs and simulations, students apply their growing ability to think scientifically, their knowledge of cell chemistry, and their skills in simple probability and statistics to develop an understanding of both classical Mendelian inheritance and its underlying causes in the chemistry of cellular DNA.

Edison's science program effectively engages early adolescents and provides a coherent framework for their own experiences in the physical and natural world. Students see the astonishing extent to which present-day society has been shaped by past scientific discoveries and technological innovations, and they learn about the scientific dimensions of crucial issues facing people today. As they come to appreciate their own relationship to nature, students gain a fuller understanding of their own unique attributes.

Assessment in Action

As a culminating activity that is part of their final portfolios, each student develops and submits a brief article to the *Edison Encyclopedia of Ideas* on a selected topic in genetics. For example, students discuss genetic diseases and conditions. In order for a student's article to be accepted, it must cite appropriate genetic principles from the previous weeks' study and include a brief history of the selected topic.

THE GREATS DEVELOPMENTS AND DISCOVERIES

- THE COPERNICAN REVOLUTION
- THE THEORY OF EVOLUTION
- THE ROLE OF DNA
- THE ELECTRON
- THE LAWS OF MOTION
- PHOTOSYNTHESIS
- CELL THEORY
- PHOTOGRAPHY
- THE STEAM ENGINE

STUDENTS WILL BE ABLE TO:

TREAT others with civility, even when disagreeing

MAINTAIN caring and respectful friendships that support positive behavior

APPLY democratic principles to their school, community, state, and country

PERFORM planned, regular service to the school or community and explain the benefits of such service

DESCRIBE the rewards and responsibilities of being a member of a family and of a community

EXPLAIN the responsibilities of parenthood over the course of a child's life

IDENTIFY the distinguishing characteristics of love, such as caring, commitment, responsibility, and respect

COMPLETE long-term projects and assignments with attention to quality

UNDERSTAND the concept of integrity as it relates to their own lives and the lives of others

IDENTIFY examples of courage and heroism in literature, news accounts, and everyday events

OBSERVE the Student Code of Conduct written by faculty, parents, and students

DEMONSTRATE resistance to negative peer pressure

In the Age of Wonder, students begin grappling with issues that are fundamental in shaping their adult character. Helping them explore their questions about growing up is an important goal of the character and ethics curriculum at this level. Because relationships with others are so important

to early adolescents, we also help them develop healthy friendships and interact positively with teachers. In addition, we strive to guide students toward responsible behavior as they encounter the moral and ethical challenges of early adolescence.

Character and Ethics

Teachers take advantage of every opportunity to explore themes in character and ethics in all areas of the curriculum. For example, the Junior Academy reading list is carefully chosen to include books that provide the starting point for discussions on topics such as love, friendship, trust, relationships, courage, heroism, tolerance, and self-respect. Selections for independent reading or for listening, from the Babylonian Epic of Gilgamesh, Homer's *Iliad*, and the medieval *Beowulf*, provide vivid examples of the epic hero of myth and legend. Students also encounter admirable individuals from history, such as the Roman republican general Cincinnatus or King Mansa Musa of Mali. Two contemporary books about heroes, *The River* by Gary Paulsen and *Local News* by Gary Soto, lead naturally to discussions about contemporary heroes and how they compare with heroic figures in history. Students also discuss how heroism often differs from the modern idea of celebrity.

THE GREATS IN CHARACTER AND ETHICS

- ARISTOTLE'S *Nicomachean Ethics*
- *The Epic of Gilgamesh*
- HOMER'S *Iliad*
- PLUTARCH'S *Lives*

Although Edison schools are nonsectarian, the character and ethics curriculum, in conjunction with the history–social sciences curriculum, helps students understand the role that religion has played throughout history and how it shapes current world affairs. For example, students examine religions and other ethical systems observed by some of the people and cultures they study. Students also compare and contrast the major world religions, discussing their impact.

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The Junior Academy civics curriculum is closely related to the character and ethics program. Through literature, oral histories, historical documents, and eyewitness accounts, students explore such ideas as religious tolerance, individual responsibility, peaceable relations among people of diverse backgrounds, tolerance for others, and justice, civility, and free speech. Original ancient and medieval sources, such as Pericles' funeral oration praising Athenian democracy and the Magna Carta's establishment of rights for Englishmen, provide fascinating resources that bring democracy's ancient roots to life.

While they learn about the human body in science and health, students discuss the concepts of self-respect and integrity as they relate to caring for one's health and well-being. Unlike some courses in human reproduction that are limited to the biological, Edison's program encourages students to consider moral and ethical dimensions. Through guided discussion and age-appropriate materials, students consider such topics as caring, commitment, responsibility, and respect, and they discuss the difference between infatuation and love. Because we recognize the sensitive nature of this topic, we take great care to work with families in tailoring this aspect of our curriculum to the particular needs and concerns of each partnership school community.

We take great care to work with families in tailoring this aspect of our curriculum.

Students and teachers also have an opportunity to discuss topics in character and ethics during Home Base Advisory, which is an extension of the morning meeting. We planned this important part of the program for first thing in the morning so that students can start their day on solid ground. Typically, Home Base Advisory is devoted to outside speakers, presentations from students or school staff, or small discussion groups. Occasionally, advisers lead their groups in formally structured activities designed to help students think about and discuss topics such as friendship and responsibility.

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Community service is another major component of the character and ethics program. Students of all ages participate in regular service in the school and, as they grow older, in the broader community. But in the Junior Academy the service program provides a much-needed outlet for adolescents' developing interest in the community and world around them. Students might choose to help at nursing homes and senior citizen centers, assist in community recycling efforts, participate in clothing drives, and organize cleanup efforts in local parks and recreation centers. And all students work together with community members on a service project that requires them to examine and revise emergency preparedness plans in case of natural disasters. To ensure that they get as much out of these experiences as possible, students regularly write about and discuss their service projects, noting what they've learned—about themselves and about those they've helped.

The service program provides a much-needed outlet for adolescents' developing interest in the community and world around them.

Students also assist in mediating disputes between other students and helping to prevent serious conflicts or discipline violations. When early adolescents take responsibility for helping their peers resolve disagreements, they practice important problem-solving, interpersonal, and communications skills. They develop a deeper appreciation for concepts such as justice, impartiality, and compassion as they evaluate situations that directly affect their peers. In the effort to maintain agreements and commitments, they also learn valuable lessons in personal integrity and trustworthiness. Perhaps most important, the peer mediation program helps students understand that everyone has a role to play in maintaining a climate that is conducive to learning.

As much as we expect that the great majority of students will respond positively to our curriculum and school design, it is inevitable that cases requiring disciplinary actions will arise. Every Edison partner-

Service Learning

Along with their integrated study of natural disasters that links science, history, civics, and practical arts, the students in Mrs. Stewart's house have decided to devote the next two quarters to making sure their school is well prepared for emergencies. The class brainstorms a list of potential risks to their community, then they narrow down the list to those that are most likely to occur. The class then breaks into small groups, each responsible for researching a different disaster possibility. The groups investigate their school's existing plans for coping with each type of disaster, evaluate the feasibility of those plans, and recommend necessary changes. At each stage of this process, the groups report their findings and solicit comments from classmates, their principal, and members of the school committee of teachers and parents.

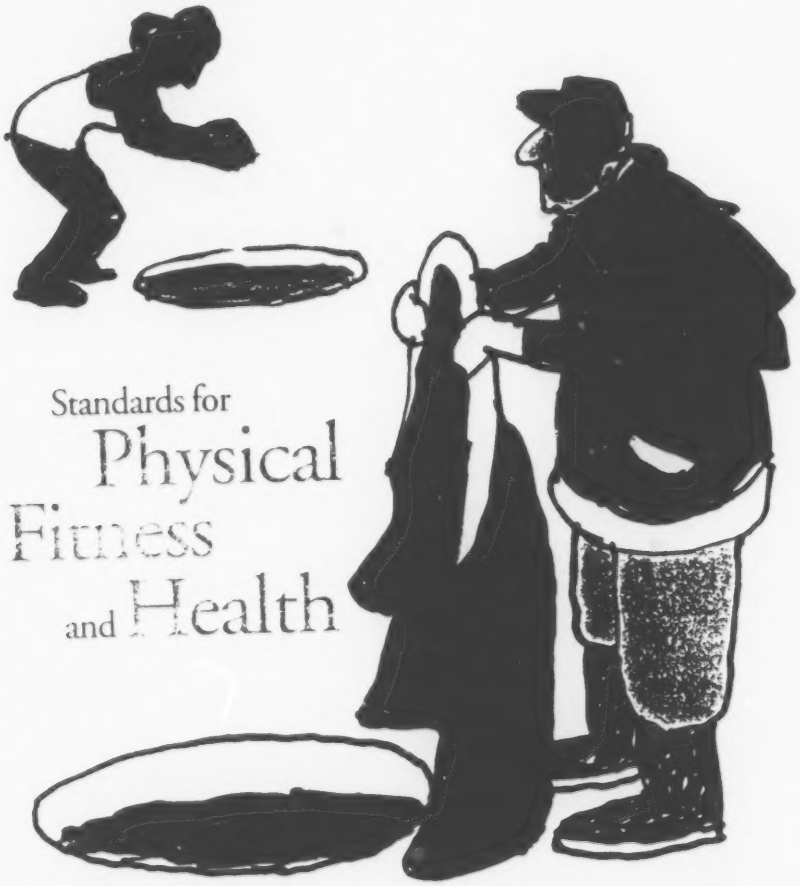
ship school develops a coherent schoolwide policy for addressing these issues. Although each school, working with Edison, tailors such policies to the needs of its community, certain important features are common to all schools. The principal and teachers bear ultimate responsibility for enforcing disciplinary policies.

We also introduce an honor system at this level. Students participate in developing their academy's Student Code of Conduct describing acceptable behavior, an activity that teaches them valuable lessons about making laws and about the need to enforce common standards of behavior. Violations may range from cheating on tests to defacing school property. The penalties for these violations are likely to consist of restitution or brief in-school suspensions. Procedures are developed for ensuring that enforcement of the Student Code of Conduct is prompt and consistent.

As they continue to develop and reinforce basic aspects of good character, such as diligence, fairness, and kindness, students are ready to think in sophisticated ways about the challenges they encounter in early adolescence. Edison's character and ethics program provides them with regular opportunities to discuss those issues in a supportive environment, with consistent help from caring adults and peers.

Assessment in Action

Plutarch's engaging *Lives*, comparing the qualities and accomplishments of admirable Greeks and Romans, provides the framework for students' portfolio assessment in character and ethics. Beginning in year two, students select admirable individuals they've encountered in history or literature, pair those individuals with their modern counterparts, and write comparative descriptions. For example, a student might pair Hero, the ancient Alexandrian inventor known for his commitment, creativity, and craftsmanship, with Marie Curie, who also demonstrated diligence, imagination, and skill in applying the tools of scientific investigation. By the end of the academy, students will have accumulated impressive volumes of their own creation!



Standards for
Physical
Fitness
and Health

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Physical Fitness

IN PHYSICAL FITNESS, STUDENTS WILL BE ABLE TO:

DEMONSTRATE mature motor patterns and basic skills while participating in intramural team or individual sports

DEMONSTRATE competent offensive and defensive techniques in sports and games, such as successfully shooting a basket or defending a goal in soccer

MEET developmentally appropriate and individualized objectives for speed, flexibility, strength, and endurance through regular participation in physical activity

MEET benchmarks established by the President's Council on Physical Fitness and Sports

MAINTAIN target heart rate while participating in vigorous activity for a sustained period of time

DESIGN and maintain a personal fitness plan

IN HEALTH AND NUTRITION, STUDENTS WILL BE ABLE TO:

IDENTIFY when to participate in regular health screenings such as dental and eye exams and maintain records as part of a personal fitness plan

DETERMINE appropriate muscle-to-fat ratio

EXPLAIN how the human immune system works and identify common communicable diseases

EXPLAIN the human reproductive system

DEMONSTRATE correct posture for sitting, standing, lying down, lifting, and walking

DESCRIBE the detrimental effects of using nicotine, stimulants, inhalants, alcohol, marijuana, cocaine, and depressants

DESCRIBE healthful ways to handle disappointment, anger, stress, and negative peer pressure

DESCRIBE the relationship between total calories, the sources of those calories, body composition, and energy expenditure

LIST illnesses that may result from improper storage, preparation, and cooking of foods

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Standards for
Personal Safety

IN PERSONAL SAFETY, STUDENTS WILL BE ABLE TO:

DEMONSTRATE street safety practices and basic first-aid techniques

DEVELOP emergency plans and maintain safety equipment/supplies for home and school in the event of natural disasters, such as earthquakes, floods, hurricanes, and tornadoes

DEMONSTRATE ways to prevent injury to bone and muscle tissue during physical activity and to use physical fitness equipment properly

In the Age of Wonder, one question on every student's mind is, Why is my body changing? During these crucial years, we guide students toward making wise choices as they negotiate the physical, social, and emotional changes associated with early adolescence. For example, in conjunction with the science curriculum, students begin a comprehensive study of the human body designed to provide them with important knowledge about their own changing bodies. In keeping with our then-and-now approach to history and the social sciences, students explore changes in how people have viewed fitness since the earliest civilizations. Of course, in terms of the bodily changes experienced by early adolescents, the "now" is more important than the "then." As we focus on the unique needs of students in this age group, we continue to lay the groundwork for a lifelong commitment to physical fitness and health.

Fitness

When they enter the Junior Academy, students' bodies, emotions, and social interactions are changing—some more quickly than others. These are the years in which some students begin to feel uncomfortable about changing in the locker room or performing on the playing field. Some may decide to abandon physical activity entirely. We help students understand that physical fitness is for everyone—not just jocks or natural athletes—and that regular physical activity is more important than the quality of one's performance. Through a varied program that stresses individualized fitness goals, we help all students understand the benefits of continuing the strenuous physical activity they enjoyed in earlier academies.

This is the time to focus on fitness activities that enhance aerobic power, strength, flexibility, and body composition. Students develop well-rounded physical skills through a variety of activities—from walking to basketball to jogging. They participate in physical education activities with a fitness specialist for one hour each day.

Although we expect all students to achieve benchmarks established by the President's Council on Physical Fitness and Sports, we also promote an individualized approach to fitness. During the Junior Academy, students continue to revise and maintain their personal fitness plans, adding sequences of movement that are technically challenging in aerobics, gymnastics, or track and field events. As their knowledge of fitness training and conditioning grows, they commit themselves to setting personal goals for improvement. In this area, the fitness specialist is the students' personal trainer, helping them devise self-assessments for tracking progress and improvement over time. In

conjunction with the practical arts and skills program, students also learn to use computers and other electronic devices to maintain a record of their fitness progress.

We encourage students to aim for their own personal best in physical activities, but we also want early adolescents to be realistic about how far they should push themselves in exercise, weight training, and dieting. At this age, many girls begin to view themselves as fat, while boys often want to be taller and more muscular than they are. We stress the importance of accepting individual differences in achievement and physical skills, and our fitness specialists are trained through Edison's professional development program to identify students who may need extra help in accepting their appearance and abilities.

We encourage students to aim for their own personal best in physical activities.

We encourage students to participate in intramural sports programs for two of their three years in this academy. Intramurals provide additional opportunities for students to engage in physical activity and to test their developing skills. Students also appreciate the importance of teamwork and learn valuable lessons about winning and losing—areas that are also stressed in the character and ethics program.

We introduce peer coaching activities at this level in order to promote mutual skill development. Students learn the rules, regulations, and etiquette of team sports, develop respect for the decisions of game officials, and begin to apply offensive and defensive strategies on the playing field. Because early adolescents are more capable of complex eye-hand coordination, we also begin more rigorous skill drills at this time. In addition, we encourage students to explore the history of recreation and to examine how and why people have invented games through the ages.

Early adolescents want to use their new physical skills—sometimes in risky activities like skateboarding or motorbiking. The Edison physical fitness program provides students with guidance on the subject of risk so they will be less inclined to undertake potentially dangerous activities without proper supervision. When possible,

students may learn basic outdoor pursuit skills such as backpacking, rock climbing, hiking, and ropes courses, in addition to tumbling and gymnastics activities involving apparatus such as parallel bars and the balance beam. Rollerblading and cycling may also have a place in the program, with the emphasis on safety and proper use of helmets, hand signals, and so on.

The physical fitness program relates to all areas of the curriculum. For example, students explore the concepts of rotation, spin, and rebound in science and learn how to apply those concepts on the playing field. In concert with the history curriculum, they examine the role of games in civilizations, from ancient times up to the present day. In one intensive project they research the early Olympic Games and organize their own Olympic sporting events at the end of seventh grade. Students also learn ethnic dances as they study both ancient civilizations and contemporary cultures.

Health

The health curriculum focuses on the physical, mental, emotional, and social growth of adolescence. The Edison program carefully links the health, science, and character and ethics programs when dealing with human reproduction. As they explore the human body through the science curriculum and in character and ethics, students have opportunities to discuss issues that are crucial to their health and well-being at this special time in their lives. We work closely with families and teachers to develop a health curriculum for this age group.

Junior Academy students are ready to increase their knowledge of personal health and health practices and can take greater responsibility for the prevention and treatment of disease. We emphasize the early detection of health problems and ensure that all students participate in routine health screenings, such as dental and eye exams. We teach them how and why to avoid injury to bone and muscle tissue during physical activity and how to maintain proper posture while sitting, standing, walking, and lifting. As they study the human immune system in science, students learn that many communicable diseases are preventable, based on decisions they make now and in the future. They also learn to recognize the signs of common communicable diseases among adolescents, how and when to treat illnesses at home, and when to seek medical attention.

We ensure that all students participate in routine health screenings, such as dental and eye exams.

Students wonder about a lot, but experiencing wonder is not always wonderful. This can be a time of great turmoil and adjustment, and so we emphasize emotional health as well as physical health. Students learn to recognize the negative effects of drug and alcohol use, and they develop alternative strategies for coping with anger, disappointment, and stress. Because peer-group approval is so important at this time, the character and ethics program helps students understand how friends may influence their behavior and equips them with the communication and assertiveness skills they need in order to avoid dangerous situations.

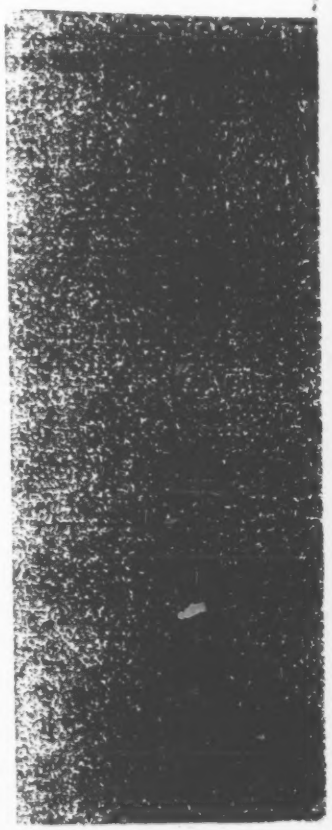
Early adolescents who are experiencing physical changes have unique nutritional needs. We help students evaluate and adjust their personal diets to meet the nutritional requirements for growth and activity during this stage of their lives. Students learn about the relationships between total calories, the sources of those calories, body composition, and energy expenditure. And because students are beginning to spend more time in social settings, we develop positive peer pressure to help

ACTIVITIES

MONITORING GOOD HEALTH

Fitness specialists in the Junior Academy use a variety of high- and low-tech measurement tools to assess students' fitness and health in these areas:

- Pre-exercise heart rate (heart monitor)
- Mile run (heart monitor)
- Recovery heart rate (heart monitor)
- Blood pressure (sphygmomanometer)
- Body fat percentage (computer and skin calipers)
- Lung volume (spirometer)
- Posture efficiency (Martin posture gram)



them make healthful food choices wherever they are—in the school's cafeteria, in a fast-food restaurant, or at home. In one special study, students learn about the health risks associated with improperly stored and cooked meats, such as hamburgers. They also investigate the effects on the body of healthful eating, overeating, and undereating.

Safety

Just as students commit themselves to maintaining fitness and health in this academy, they also take more responsibility for staying safe in all areas of their lives. Because they may be prone to risk taking at this age, they discuss positive and negative risks, examine how peers can pressure them to participate in unsafe activities, and learn strategies for saying no and for recognizing when activities require adult supervision. As they build on the skills they developed in earlier academies, students continue to apply street safety techniques, such as responsibly handling unwanted approaches from strangers.

Students are ready to take responsibility in emergency situations, making this a good time to teach basic first-aid techniques in addition to CPR and the abdominal thrust maneuver. Early adolescents are also concerned about the world around them and have a strong desire to contribute to the welfare of others. To capitalize on these feelings, students work with members of the community to develop or refine local plans for natural disasters.

In all areas of the curriculum, students are learning to be discriminating readers, listeners, and viewers. In the safety program, they apply those skills to detecting false

claims about exercise equipment, fitness programs, and diets. Students learn to tell the difference between safe and unsafe products and programs and to read packages, labels, and brochures with a critical eye. They also learn that equipment that is inherently safe may be used in unsafe ways and develop strategies for protecting themselves while using exercise and fitness products at school, at home, and in the community.

Edison's academy structure and small school-within-a-school organization provide the nurturing, supportive atmosphere that early adolescents need for better physical and emotional development and health. All students receive guidance and support from interested adults who know them well. Together, teachers, students, and their families successfully navigate the waters of early adolescence.

Assessment in Action

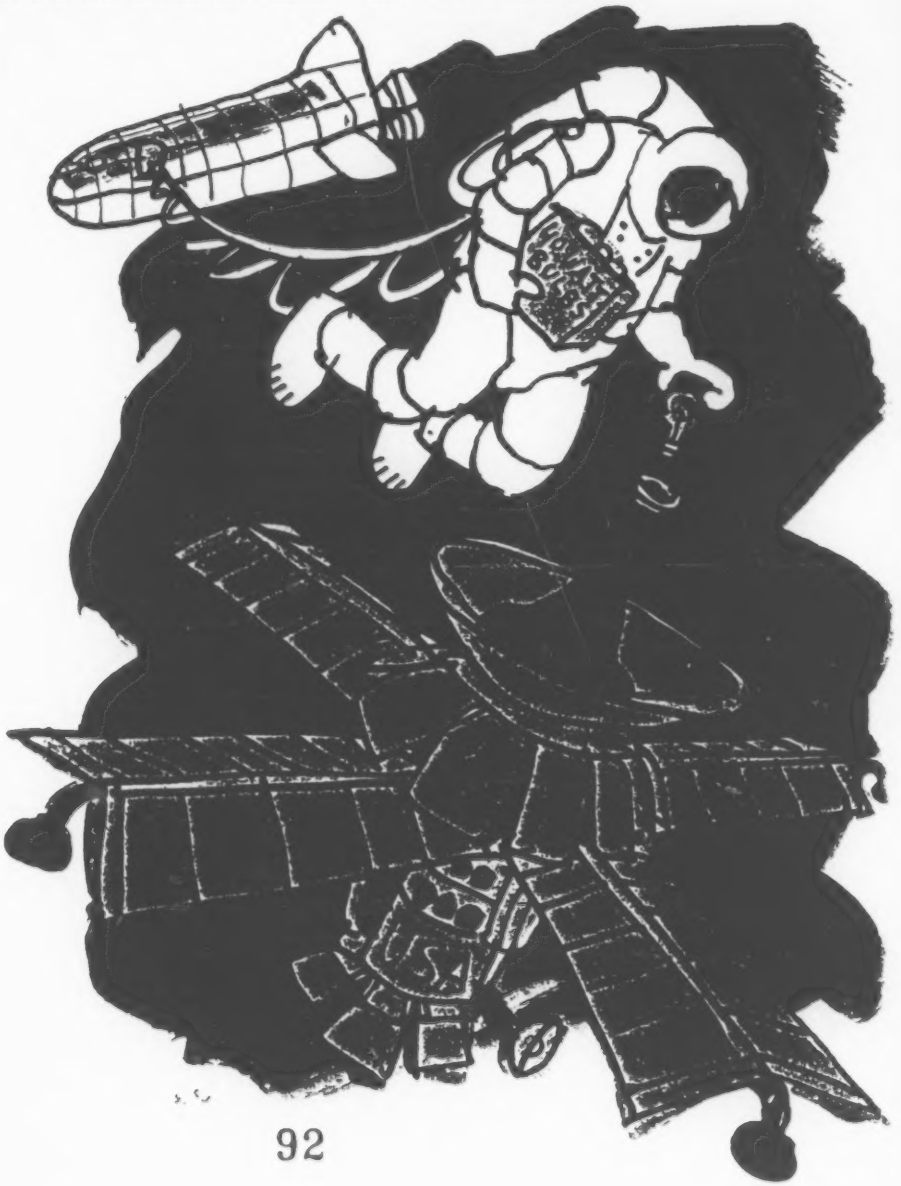
Students often demonstrate their understanding of fitness concepts through creative written or oral assessments that link other areas of the curriculum, such as language arts and practical arts and skills. In one such assessment, students work in groups of four to write and design a four-page brochure describing how their classmates might stay in shape over the summer. Fitness specialists evaluate the brochures for accuracy, realism, and fun and for how accurately they reflect the concepts that will be tested on standardized physical fitness tests. In another assessment, students teach three fitness concepts each, while classmates videotape the sessions.

THE GREATS: GAMES AND SPORTS FROM LONG AGO

Archery
Ball games
Biathlon
Chariot races
Decathlon
Fencing
Footraces
Javelin hurling
Wrestling

Standards for

Practical Arts and Skills



STUDENTS WILL BE ABLE TO:

PRESENT a two-dimensional model of a new product using the computer

SELECT materials and tools appropriate to the design task at hand, including desktop publishing

DEMONSTRATE competence in acquiring information from on-line sources

DEVELOP a multimedia presentation on a topic being studied by combining sound, images, and text

USE computers, video recorders, CD-ROMs, and other electronic tools, including desktop publishing, competently and creatively

FOLLOW documentation and on-screen help to learn how to use computer graphics, drawing, and presentation programs

ORGANIZE and communicate information to others using a variety of methods and formats, including overheads, handouts, oral presentations, and computer-generated graphs and charts

APPLY basic workplace skills such as planning, scheduling, and working in teams to handle all facets of an activity, such as staging an academy-wide play or variety show

USE study techniques and strategies, such as organizing work, taking notes, making an outline, and forming appropriate questions

MAINTAIN personal recreation items such as bicycles, including performing minor repairs

USE new food labels in order to make wise consumer choices based on price and nutritional issues

READ road, subway, or bus maps; follow bus or train schedules; read airline arrival and departure screens

MAINTAIN a personal calendar or schedule of work assignments, school activities, and leisure pursuits, using traditional methods and the computer

DEMONSTRATE basic child care skills such as feeding a baby

DEMONSTRATE street safety techniques and outdoor survival skills

Standards for
Practical Arts and Skills

Students in the Junior Academy often wonder what they will be when they reach adulthood. The practical arts and skills program provides them with varied opportunities to be useful, to solve real-world problems, and to contribute to society in productive ways while developing the skills they will need for successful adult living. In the Age of Wonder, students gain a deeper appreciation for creativity, craft, and their own developing talents as they refine their design skills through hands-on projects that cross the curriculum. They attain new levels of mastery in the area of technology and begin to see that computers and other electronic tools can help them acquire, interpret, and communicate information in creative ways. They learn how their developing knowledge and skills connect to the experiences they will have in the workplace, and they develop practical skills like emergency preparedness that contribute to their overall confidence.

Practical Arts

When students design and make things, they turn ideas into practical outcomes. They acquire information in order to identify needs and opportunities, generate plans and products that meet those needs, and evaluate how well they succeeded. The design process benefits students of all ages but is particularly effective with early adolescents. Edison's distinctive design curriculum, called the KID (Knowledge, Inquiry, Design) Program, allows students to focus their energies in practical ways, develop their problem-solving skills, and develop strategies needed to work cooperatively toward a common goal. The design process also builds bridges between the arts and sciences as students work in many disciplines to communicate their ideas, implement their plans, and assess the results.

How were the pyramids designed? Why did people build roads? At this level, much of the design curriculum grows out of students' questions about ancient history. They learn that people design everything they make and that designed objects are cultural artifacts that provide clues about the people who used them. Students read David Macaulay's engaging *The Motel of the Mysteries* and discuss what artifacts from our contemporary culture might reveal to future generations. As they explore photographs, video clips, and computer-generated images of ancient tools, jewelry, clothing, transportation devices, and so on, students ask and answer such questions as: Who used this object? Where? For what purpose? Using simple materials such as clay, wood, paints,

and glazes, they then make three-dimensional models of the artifacts they've explored and display them in an academy-wide exhibit. Students write accompanying documentation and act as guides for parents and community members who are invited to visit the exhibit for a gala opening, which the students plan and execute from start to finish.

In earlier academies, students relied on drawings, sketches, and three-dimensional models made from simple materials to represent their designs. Now they're ready to use computer-based modeling tools to create two-dimensional designs for evaluation and criticism. In one intensive project, students research the history of timekeeping devices, comparing early devices such as the sundial to today's digital clocks and watches. Then they work in groups to design a new clock or watch for teenagers of the future, using the computer to develop their models. Students think like designers as they answer such questions as: Who will use this timepiece? What special features might address their needs? What materials best represent our vision of the perfect clock or watch? Finally, the students present their design to a jury of students, teachers, and professional designers who provide constructive criticism and feedback.

> When students design and make things, they turn ideas into practical outcomes.

In this academy, we place increased emphasis on the role of criticism and feedback in the design process and encourage students to set high standards when evaluating their own and others' designs. The students' interdisciplinary study on The Great Wall of China provides a perfect mechanism for helping them develop their evaluative skills. Teams of students examine photographs, videos, and written descriptions of the wall in order to prepare a formal critique of its design and execution. When preparing their critique, they answer such questions as: How well did the Great Wall succeed in achieving its intended purpose of keeping out invaders? Were the materials used to build the wall appropriate to its design? What does the fact that the wall still stands say about the way it was designed and built?

Technology

By the time they enter the Junior Academy, students have become proficient users of technology and software. Among other things, they've learned to open and retrieve files, send and receive E-mail, load and run commercial software, and create simple spreadsheets and databases. Having become comfortable with technology and confident of their skills, they're ready to be creative in their use of computers, video recorders, audio equipment, CD-ROMs, and telecommunications programs.

In the Age of Wonder, students use technology in every subject area as often as they use pencils and pens.

In the Age of Wonder, students use technology in every subject area as often as they use pencils and pens. For example, they use spreadsheets, databases, and graphing programs to explore and represent mathematical ideas. They create multimedia presentations on many of the topics they study in history, geography, civics, and economics. They use word processing and desktop publishing programs to package the written work they produce in language arts and other subjects. And they use computer simulations as they wonder about and explore aspects of the physical and scientific world.

Students also have regular opportunities to develop and refine their basic skills in technology. We expect them to demonstrate proficient keyboarding skills by the time they leave this academy and to competently acquire and use information from on-line sources. We also encourage students to follow printed documentation and on-screen help menus to learn how to use more sophisticated commercial programs and tools such as drawing and presentation programs. Our goal is to help students learn that their basic technology skills, such as following documentation and navigating screen menus, can translate to all types of hardware and software.

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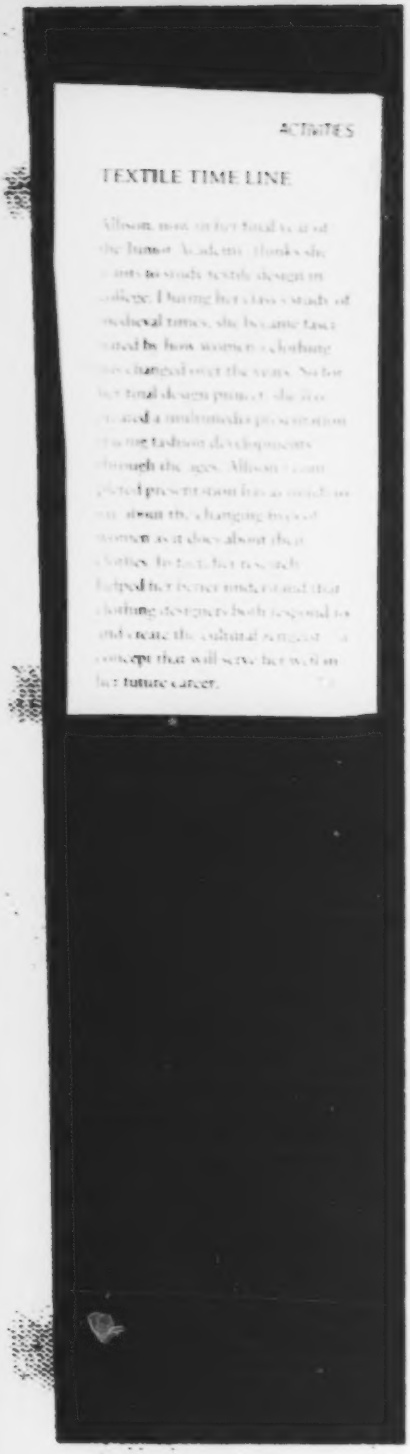

Workplace Skills

The question, What will I be when I grow up? takes on new meaning in the Age of Wonder as students begin to think more seriously about their future careers. In this academy, they maintain a computer database called "My Brilliant Career," in which they collect information on the careers they find most interesting. Students interview members of their local business community to research the necessary education and skills, salary ranges, and opportunities for advancement in the fields of their choice. As a final assessment, students prepare oral reports on their career options.

Recent labor studies show that the most highly prized workers are competent at planning, working in teams, interpreting instructions, locating information, and using technology. Students who work together on projects and problems function as they will in the workplace and are more involved in their own learning. The practical arts and skills curriculum provides regular opportunities for students to connect their developing knowledge and skills to situations they are likely to encounter in the workplace. For example, one long-term project that also relates to the study of history requires students to apply workplace skills such as planning, scheduling, and working in teams to organize an academy-wide museum exhibit and gala opening.

Students who work together on projects and problems function as they will in the workplace and are more involved in their own learning.

Information management, another important workplace skill, receives increased attention in this academy. Students not only learn to locate information from a variety of traditional and nontraditional sources—from electronic encyclopedias to phone bills—they also explore effective ways to communicate that information. Students are required to give at least one formal oral presentation each year on a topic of their choice and to supply

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the audience with related information in a variety of formats, including slides, handouts, overheads, and computer-generated charts and graphs.

In every curriculum area we teach students to organize and approach their work in more effective and efficient ways. Study skills such as prioritizing assignments, planning time, making outlines, and organizing materials help students succeed in school while preparing them to be more productive workers.

In addition, we encourage Junior Academy students to maintain home and school-based jobs. For example, students may act as fitness assistants, tutors, and computer consultants in school and baby-sit, clean, or perform yard work at home. These jobs teach important lessons about responsibility and help students be productive, contributing members of their families and the school community.

> As students develop the skills they'll need for successful adult living, they face the future with confidence.

Life Skills

Edison's practical arts and skills program aims to equip students with the skills they'll need for a life of engagement at home, at school, and in the community. Moreover, we want students to approach new and sometimes complicated tasks and situations with confidence. In this academy, we build that confidence by focusing on skills that are as varied as reading a bus map and safely caring for a baby.

Early adolescents are ready to take increased responsibility in many areas of their lives, starting with the care and maintenance of some of their most treasured possessions. Students learn how to maintain bicycles, for example, and how to perform minor repairs in order to keep them running smoothly. Students at this level also take on more responsibility for caring for younger siblings and some may be ready for baby-sitting jobs. To ensure that our students approach these responsibilities with skill, we teach the basics of child care through the science and health curriculums, with emphasis on child safety and first aid. And because students are now likely to be more responsible for household chores such

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as grocery shopping, we stress the importance of reading food labels carefully in order to make informed nutritional and economic decisions. Finally, we help students stay on top of the increasing demands on their time by teaching them how to maintain personal calendars and apply simple time-management techniques.

In the Age of Wonder, students' horizons expand. In fact, some may be ready to travel by bus, train, or plane unsupervised by adults. In coordination with the geography curriculum, students learn to read road, subway, and bus maps and to follow train and airline schedules and arrival/departure screens. Through the safety program, they learn outdoor survival skills and build on the street safety techniques they learned in earlier academies, such as how to handle unwanted approaches from strangers.

Edison's practical arts and skills program helps take the guesswork out of that all-important question, What will I be? As students develop the skills they'll need for successful adult living, they face the future with confidence.

Assessment in Action

In conjunction with the safety curriculum, students in their last year of the Junior Academy spend one of their intensives analyzing their school and community's disaster preparedness plans, then draft suggestions for improving those plans. Groups of students work closely with appropriate members of the community to identify problem areas and find solutions. As a final assessment, students must apply what they've learned about community preparedness to develop a new disaster plan for their school if needed.

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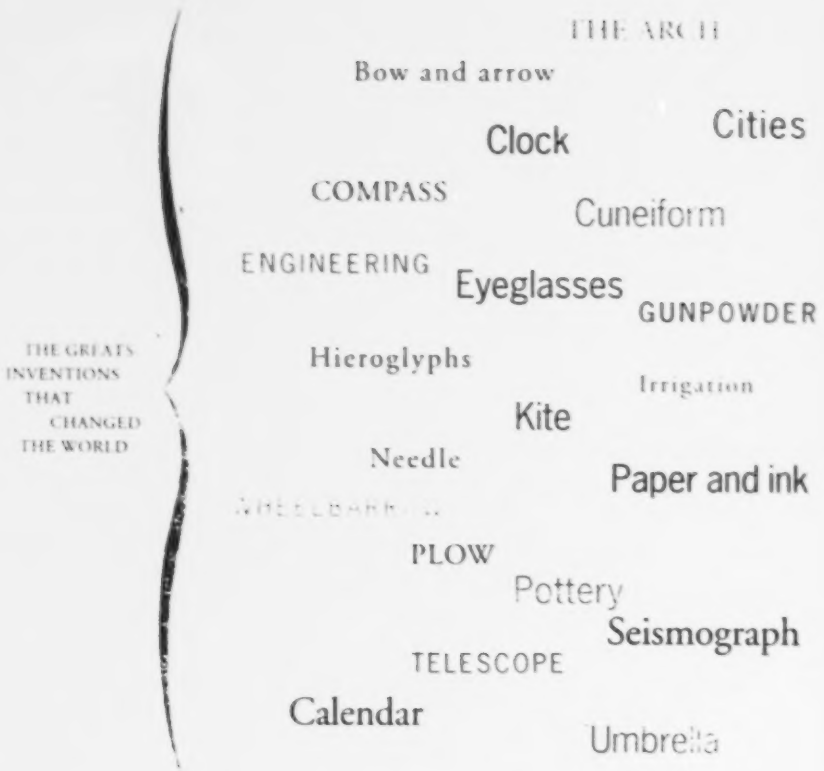

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Ensuring Student Success

By the end of the Junior Academy, students have found answers to many of their questions about the world and their changing place in it. Among their activities, projects, and explorations, they have created an annotated time line of great developments and discoveries since the dawn of civilization, completed an integrated study of the human body, designed models of ancient artifacts for inclusion in a schoolwide museum exhibit, and communicated with people around the world. For the final assessment, students prepare multimedia presentations related to their study of ancient history, called "Communications: From Cicero to CNN."

The assessment is deliberately structured to integrate learning from several content areas.

This assessment requires students to present a report on the history of communications, from cave paintings to the printing press, television, and electronic mail. Students may choose from multiple media to craft their presentations, but each student must present the final product orally to a panel of teachers, community members, and peers. Each presentation is videotaped for inclusion in the student's electronic portfolio. In addition to tracing the history of communications, each student must choose one of the civilizations studied in this academy and discuss how changes in communications affected that society. Students also compare and contrast old and new media. Finally, students look at the impact of new communications technology on today's world and predict how future developments might change the world of tomorrow.

The assessment is deliberately structured to integrate learning from several content areas. In addition, students demonstrate their grasp of one of the academy's important ideas—that the present and future have their foundation in the past. The following vignette illustrates how one teacher evaluates the assessment and how she enlists parents, students, and colleagues in guaranteeing her students' academic success.

Assessment in Action

Mrs. Grant and Ms. Liu are discussing Rob's Cicero to CNN presentation. Generally, they are pleased with his efforts, noting his improvements in presenting information orally and his ability to describe technological developments in a way that is lively and engaging.

Ms. Liu notes that the time line Rob constructed for his presentation is not accurate, so she and Mrs. Grant compose a recommendation to the student and his parents. The two teachers want to make it clear that Rob needs help with his sense of chronology during his final month in the Junior Academy. The teachers work on the statement, then enter it in Rob's electronic portfolio. Later, Ms. Liu writes an E-mail message to Rob's parents, asking them to download the file so they can see the recom-

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mendation and respond to it. The next day, Ms. Liu explains to Rob what she has said to his parents. Together, Ms. Liu and Rob look at the time line he created tracing developments in communications and discuss how they will work together toward improvement over the next month.

Ms. Liu wants to make Rob's electronic portfolio, which includes his own self-assessments, useful to the teachers who will work with him next in the Senior Academy and also helpful to Rob himself, who will use the portfolio to reflect on his own growth. Of course, the Cicero to CNN presentation isn't the only item used to judge Rob's readiness for the next academy, but it is an important part of his overall evaluation and provides a clear record of his growth and development.

The Edison Edge

High standards, state-of-the-art technology, ongoing assessment, and regular communication between school and home ensure that Rob and all his peers in partnership schools get the support they need. But the Edison edge comes down to the talent and creativity of local teachers and principals in partnership schools. They are the ones who create a positive atmosphere for learning and develop inspiring, well-crafted lessons.

Edison understands that teachers who are supported by principals acting as instructional leaders are vital to a school's success. And nothing is more critical to the quality of their work than a support structure. In the Edison system, that support comes in the form of extensive professional development, state-of-the-art technology, and regular opportunities for collaboration and teamwork. In addition, we provide model lessons and assessments to guide teachers as they develop their own.

Working in cooperation with our public school partners, we believe that we can provide all students, regardless of economic or social circumstances, with an education that is academically excellent, that is rooted in democratic values, and that prepares them for productive lives.

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The Edison Project recruited some of the country's leading educators—from the classroom and from the offices of local and state superintendents—to work with us in developing the standards, activities, and assessments described in this publication. We also consulted with representatives from business and the arts. Although we are solely responsible for the contents of this book, we wish to thank the following people for their time, encouragement, guidance, and collective wisdom:

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